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Crop Production

THE UNIVERSITY OF MINNESOTA

BULLETIN

Vol. V. JUNE 1, 1902. No. 7

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UNIVERSITY OF ILLINOIS

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THE REGISTRAR,
The University of Minnesota,
Minneapolis, Minn

The University.

THE UNIVERSITY OF MINNESOTA comprises the following named colleges, schools and departments:

THE GRADUATE DEPARTMENT.
THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS.
  The School of Technical and Applied Chemistry.
THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS.
THE SCHOOL OF MINES.
THE COLLEGE OF AGRICULTURE.
  The School of Agriculture.
  Short Course for Farmers.
  The Dairy School.
  THE COLLEGE OF LAW.
THE DEPARTMENT OF MEDICINE, composed of colleges as follows:
  The College of Medicine and Surgery.
  The College of Homeopathic Medicine and Surgery.
  The College of Dentistry.
  The College of Pharmacy.

The Regents of the University have also entrusted to their charge
  THE EXPERIMENT STATION;
  THE GEOLOGICAL AND NATURAL HISTORY SURVEY.

THE GRADUATE DEPARTMENT. In each of the colleges, except that of medicine, there are advanced courses of study leading to second degrees. These courses are open to graduates of any reputable college upon presentation of diploma.

IN THE COLLEGE OF SCIENCE, LITERATURE AND THE ARTS there are

of medicine, there are advanced courses of study leading to second degrees. These courses are open to graduates of any reputable college upon presentation of diploma.

In the COLLEGE OF SCIENCE, LITERATURE AND THE ARTS there are four four-year courses of study, the classical, scientific, literary and civic. The classical course offers for its leading studies the Greek and Latin languages; the scientific course, the natural and physical sciences; the literary course, the modern languages; the civic course, history and economics. The completion of the courses leads respectively to the degrees: bachelor of arts, bachelor of science, bachelor of literature, and bachelor of philosophy. The advanced degrees offered in this college are: master of arts, science, literature and philosophy, and doctor of philosophy.

The School of Technical and Applied Chemistry, leading to the degree of bachelor of science, is also organized as a part of this college.

A Summer School for Teachers. A four weeks' course of instruction is offered, in various University subjects, for those whose school duties prevent them from taking the regular University courses.

THE COLLEGE OF ENGINEERING AND THE MECHANIC ARTS offers courses of study, of four years each, in civil, mechanical and electrical engineering; leading to the degrees of civil mechanical and electrical engineer. This college offers a four years' course of study in science and technology leading to the degree of bachelor of science, with an additional year leading to the engineer's degree in the various lines offered in the college. This college also offers graduate work leading to the degree master of science.

THE SCHOOL OF MINES offers a four years' course of study in mining and metallurgy; upon the completion of which the degrees engineer of mines and metallurgical engineer are conferred,

THE COLLEGE OF AGRICULTURE offers a regular course in agriculture of four years college work; the degree of bachelor of agriculture is conferred on completion of this course.

THE SCHOOL OF AGRICULTURE is open to both men and women, and is a training school for practical farm life and in domestic economy. The college of agriculture is open to graduates of this school.

A Dairy School offers practical instruction in dairying to those who have had some experience in conducting a dairy.

The short Course for Farmers provides an eight weeks lecture course in agriculture, liva stock and horticulture for mature farmers.

THE COLLEGE OF LAW offers a three years' course of instruction, leading to the degree of bachelor of laws. There is an evening class in this college leading to the same degree. This college offers graduate work leading to the degrees, master of laws, and doctor of civil law.

THE COLLEGE OF MEDICINE AND SURGERY and THE COLLEGE OF HOMEPHTHIC MEDICINE AND SURGERY each offers a four years' course of study, of eight and one-half months each. Upon completion of the prescribed course the degree doctor of medicine is conferred.

THE COLLEGE OF DENTISTRY offers a three years' course of study of nine months each; upon completion of the prescribed course the degree of doctor of dental medicide is conferred.

THE COLLEGE OF PHARMACY offers a two or three years' course of study, leading to the degree of pharmaceutical chemist. This college also offers graduate work leading to the degrees, master of pharmacy, and doctor of pharmacy.

SPECIAL COURSES. In each of the colleges, students of an advanced age and adquate preparation, are permitted to pursue under the direction of the faculty one or two distiuct lines of study.

Bulletins of any department sent free to any address, upon application. The full catalogue will be sent only upon receipt of ten cents to cover postage. Address, THE REGISTRAR,
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*Died October 18th, 1901.

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Allen W. Guild, *Superintendent of Buildings.*

CALENDAR FOR 1902-1903.

1902.

JULY.

S.	M.	T.	W.	T.	F.	S.
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1903.

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The year 1903-1904 will begin September 1, 1903.

Calendar by Schools, 1902-1903.

COLLEGE OF AGRICULTURE.

SEPTEMBER 2 to 8—Entrance examinations.
" 9—Classes 1st Semester begin.
DECEMBER 20—Holiday recess begins.
JANUARY 6—Holiday recess ends.
" 22—End of 1st Semester.
" 27—Beginning of 2d Semester.
MAY 25 to 28—Semester examinations.
JUNE 4—Commencement.

SCHOOL OF AGRICULTURE.

OCTOBER 1, 1902—Entrance examinations and registration.
" 2, " —Entrance examinations and registration.
—Chapel at 4 p. m. Regular classes begin.
" 4, " —Literary and class societies meet.
" 14, " —Home dairying begins.
" 31, " —Examinations.
NOVEMBER 27, " —Thanksgiving Day; no classes.
" 29, " —Examinations.
DECEMBER 19, " —Term examinations.
" 20, " —Holiday recess begins.
" 29, " —Entrance and condition examinations.
" 30, " —Classes called; work resumed at 8:15 a. m.
JANUARY 1, 1903—New Year's Day.
" 6, " —Home dairying begins.
" 31, " —Examinations.
FEBRUARY 12, " —Lincoln's Birthday; no classes.
" 22, " —Washington's Birthday; no classes.
" 28, " —Examinations.
MARCH 17, " —Term examinations.
" 18, " —Term examinations.
" 18, " —Class exercises; evening.
" 19, " —Alumni re-union.
" 20, " —COMMENCEMENT DAY. Fourteenth Annual Commencement.
" 21, " —Summer vacation begins.

DAIRY SCHOOL.

NOVEMAER 24, 1903—Term begins.
DECEMBER 20, " —Term closes.

SHORT COURSE FOR FARMERS.

JANUARY 6, 1903—Term begins.
FEBRUARY 28, " —Term closes.

COMMITTEES, DEPARPMENT OF AGRICULTURE.

- *Library;* Tucker, Reynolds, Snyder, Hays, Vye, McIntyre.
- *College and Graduate Work:* Hays, Meredith, Snyder, Haecker.
- *School of Agriculture;*
    - *Examinations and Registrations:* Robertson, Drew, Wheeler, Meredith, Mahood.
    - *Catalogue:* Vye, Robertson, Snyder.
    - *Absence and Tardiness:* Tucker, Mahood, Wheeler.
    - *Military Drill:* Cole, Green, Haecker.
    - *Entertainment:* Robertson, Meredith, Comfort.
    - *Program:* Andrew Boss, Wheeler, Drew.
    - *Health:* Reynolds, Tucker, Meredith.
- *Dairy School:* Haecker, Wm. Boss, Hays.
- *Short Course for Farmers:* Drew, Shaw, Green.

The Department of Agriculture.

The Department of Agriculture is located on the University farm, three miles from the main campus of the University, and midway between St. Paul and Minneapolis. The campus is on a beautiful elevation overlooking the twin-cities and adjoining the State Fair grounds. The artistic buildings, and native trees, supplemented by new plantations and attractive drives add greatly to the interest of the department.

This department consists of several sub-organizations: The College of Agriculture, the School of Agriculture, the Dairy School, the Short Course for Farmers, and the State Experiment Station.

The technical agricultural work of the college of agriculture, the experiment station, and of the shorter courses is combined under professors who are heads of divisions. These professors, therefore, aided by assistants, are responsible for both the experiment work and the instruction in their respective lines.

The dean and director is in immediate charge of the experiment station, the college of agriculture, and the short course for farmers. Under the dean, the principal is in charge of the school of agriculture, and the professor of dairy husbandry, of the dairy school.

The students in the college of agriculture and those in graduate work pursue their technical agricultural studies with the professors in the college of agriculture, and have open to them a wide range of subjects in the college of science, literature and the arts.

Students in the school of agriculture pursue their studies at University farm. Special instructors are employed to teach the academic studies of the high school grade which are necessary to supplement the agricultural work given by the various technical divisions of the department of agriculture.

Students in the intermediate course pursue all their studies at University farm, or in high schools or academies nearer their homes.

Students in the short course for farmers receive their instruction in the various technical divisions.

The college of agriculture year is from Sept. 9th to June 4th; The school of agriculture year is from Oct. 1st to March 20th; the dairy school is in session from Nov. 24th to Dec. 20th; and the short course for farmers is in session from Jan. 6th to Feb. 28th.

A more detailed account of the work of each division will be found under the respective headings.

EQUIPMENT.

The equipment of the Department of Agriculture of the University of Minnesota has been materially increased in recent years. The university farm contains two hundred and fifty acres of land. About forty acres are devoted to the campus, fifty acres to permanent pastures, and the remainder (mainly set aside for the experiment station), is used for instruction and experiments in field, garden, orchard and forest crops. The permanent pasture lands are rough and, in places, low and difficult to drain, but serve a very useful purpose. The one hundred and forty acres used for experiments and in giving instruction, have a good soil of mixed clay and sand, which is well adapted to its various uses. The experiments annually carried out on this land far exceed in importance the crops raised, though the method of culture used brings excellent yields. The amount of land is limited, hence portions of adjacent farms are rented for raising for sale newly bred seeds and for roughage for live stock.

The department of agriculture has also a farm of four hundred and eighty acres at Crookston, in the northwest portion of the state, and another of 352 acres at Grand Rapids, in the pine regions of Northeastern Minnesota, and rents land in Southwestern Minnesota, at Lynd. All this land is used for the experiments and educational work by experiment station officers. These farms were selected by the University as especially representive in locality, soil, etc., of the whole state.

A number of the most useful text-books and class bulletins have been prepared and others are being written. Special laboratories have been equipped; much of the apparatus and many of the methods of instruction have been devised by the teachers, and a considerable amount of museum material for demonstration work, for laboratory practice work and for research work has been collected. The fields, gardens, orchards, barns and laboratories afford much opportunity for observation in practical work, while the experiments in progress under the experiment station afford many advanced students opportunities to pursue research work.

BUILDINGS.

The buildings at University farm which have all been erected since 1884, are modern in their arrangement, and of comely appearance. Counting the proceeds from the old farm, and the appropriation made by the last legislature, the agricultural department of the University has now an investment in building of about $340,000. Even now the rapid increase of students is so crowding some buildings that additional means is needed to provide permanent quarters for several important divisions, viz. the library, agriculture, entomology, the museum, a chapel and executive offices.

Dairy Hall is a commodious building admirably arranged for the accommodation of students in dairy practice work and is equipped with an abundant supply of approved hand separators; milk, cheese, and cream vats; churns and butter workers. The dairy laboratory is supplied with all needed glassware, milk tests and other appliances used in training students in testing milk and cream and determining milk solids. It is also provided with several large lecture rooms, one of which is used in giving lectures on live stock and is so arranged that animals can be brought in for demonstration purposes when lectures on breeds and on judging live stock are given. The second floor contains the offices of the dean, the secretary, the professor of dairying, the professor of agriculture and the farm foreman.

The Home Building was the first erected on the campus. It has since been remodelled and now contains on the first floor the library, reading room, a reception room, and the offices of the principal and the registrar of the school of agriculture. In the basement are rooms which are utilized by the classes in cooking and laundering. In the two upper stories are dormitory accommodations for twenty-four students.

Pendergast Hall is a four-story building and contains on the first floor the assembly room and two small recitation rooms, one being used by the Young Men's Christian Association. On the other three floors are dormatory accommodations for ninety students.

The Dining Hall has dormitory accommodations for eighty students, besides the dining room which extends the whole length of the lower floor. About four hundred students can he served at one time.

The Girls' Home Building contains a large reception room attractively furnished with pictures, books, magazines and piano; also a commodious room used for the accommodation of day students, reference reading, and for the lectures on home administration. In addition to apartments for the preceptress there is room for about one hundred and twenty young women.

The Power House contains one lecture room with a seating capacity for seventy-five students, in which lectures are given on carpentry, power machinery and creamery engineering; also a small room containing a simple engine, steam pumps, injectors, etc. used for the purpose of instruction. The steam heat, electric light, power and water are furnished from this building for the entire campus, being carried in underground tunnels to the various buildings. For this work, four one hundred horse-power boilers, two engines and dynamos, and two deep well pumps are employed. Electric motors are used in various buildings where power is required.

The Forge Shop has been recently enlarged and a tool room, an office, an iron stock room, and a coal bin added. The shop proper covers 2700 ft. of floor space and is equipped with 44 forges, 7 vises, a foot-power trip-hammer, drill press, shear, tire shrinker, and all the necessary tools for farm blacksmithing. A blast fan furnishes blast for all the fires, and two large exhaust fans take away the smoke, giving almost perfect ventilation.

The Meat Shop affords accommodations for one hundred and twenty students in the lecture room. The killing and cutting rooms on the main floor are well adapted to large details for practice work and the basement curing rooms offer excellent opportunity for training in this branch of the work. The store rooms are refrigerated by the ammonia process and are so arranged that work started by a student at any time can be held almost indefinitely thus making it possible to require students to finish exercises in any line.

The Agricultural Chemical Laboratory contains, besides lecture and recitation rooms, laboratories for practice in elementary agricultural chemistry, the chemistry of foods, soils and fertilizers, and domestic chemistry. These laboratories are equipped with the necessary apparatus for the testing of soils, foods, fertilizers, and agricultural products. Models and illustrative material are accessible in all of the laboratories. The laboratory and the work have both been planned to meet, as far as possible, the special needs of students in both agricultural and household science.

The New Veterinary Building has been completed and is now ready for use. On the lower floor are the following rooms: veterinary class and operating room with amphitheatre seats for 80 students; pharmacy and instrument room; box stall ward; open stall ward and contagious ward; and two dissecting rooms. On the upper floor are a large museum and physiology class laboratory and private office. There are a number of new features in the stalls and stall fixtures of the hospital, e. g. methods of feeding hay and grain, method of tying to prevent horses from getting cast in the stalls, different stall flooring-material is being tested with a view to determining relative economy, durability and varying effects on horses feet.

The Horticulture building is 50x80 feet on the ground and three stories high. Attached to it is a laboratory 26x50 feet, about 4400 square feet of greenhouses, and a machine shed 20x90 feet. One floor of the main building is devoted to physics, one floor to botany and one floor to horticulture, as are likewise the greenhouse and laboratory. The building is well equipped with apparatus and collections for instruction in physics, botany and horticulture. The class rooms have an electric light stereopticon which may be used at any time. The equipment for classes in the line of horticulture and forestry is complete, consisting of fruit models, canned fruit, grafting specimens, about 1600 photos, papier mache models of flowers of forty of the principal genera, 100 colored plates of vegetables and flowers, collection of American and Phillipine woods including some very choice sections from the Pacific coast, and apparatus for estimating timber and making valuation surveys. The laboratory is used in connection with the greenhouses, which latter are in fact but laboratories and are used solely for purposes of instruction. In the work in the laboratory each student is assigned a portion of a greenhouse bench on which he carries on a number of horticultural experiments.

The drill hall contains on the first floor the gymnasium and carpenter shop, and on the second floor, two class rooms, and offices for the entomologist and the instructor in animal husbandry. On the third floor are rooms for drawing classes and a museum.

The main barn contains on the lower floor stalls for beef and dairy cattle; on the second floor, horses, seeds, grain foods and machinery. This barn has two silos, a root cellar and ample hay bays.

The sheep barn is arranged for about a hundred sheep, and is located in the middle of a field used for growing annual pasture and fodder crops for sheep, and has a silo and root cellar.

The poultry building contains apartments for a number of breeds of fowls, and is equipped for experiments in breeding and feeding poultry.

A new swine building has been provided for by a recent appropriation.

The farm house contains, besides apartments for the professor of agriculture and foremen, rooms for laborers and students, and one wing temporarily serves as a seed breeding laboratory.

The buildings at Northwest Farm, Crookston, consist of a comfortable farmhouse, a stock and grain barn and some minor buildings.

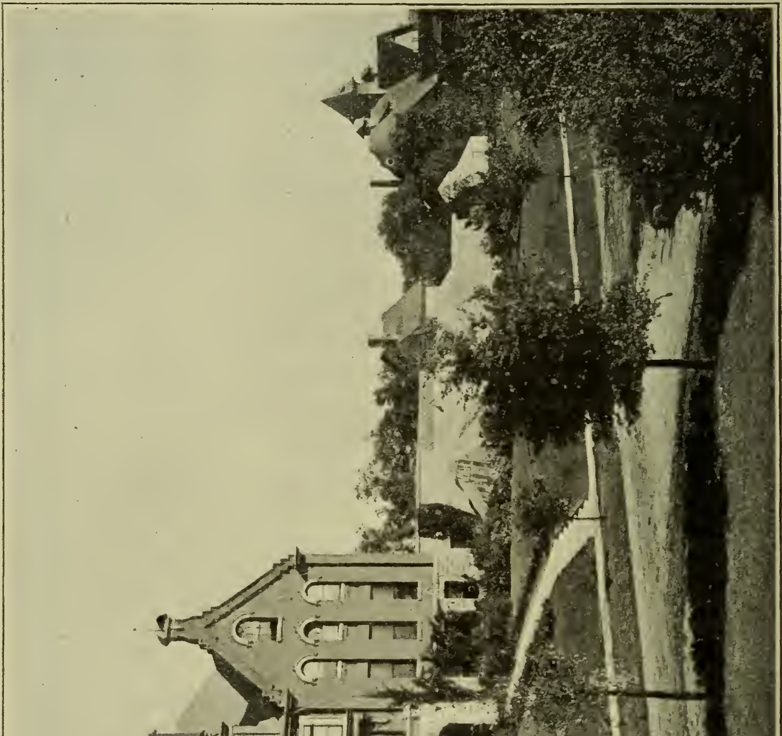
Buildings at Northeast Farm, Grand Rapids, consist of a dwelling, a general barn, a dairy barn, a small house and a root cellar.

THE LIBRARY.

The agricultural library now contains six thousand books and about six thousand pamphlets, including reports and bulletins. Aside from the large number of pamphlets and other publications of the different agricultural institutions and societies, a large number of the most important technical and agricultural magazines are kept on file, bringing together all the agricultural literature of any importance.

The librarian of the United States Department of Agriculture having inaugurated a system of co-operation with agricultural college and experiment station libraries, sent an assistant librarian who spent two months reorganizing the agricultural library. Students and teachers can now readily find literature desired, in so far as it is collected in the library and the thanks of the department are due the Secretary of Agriculture for the valuable aid given. Further co-operation with the Department of Agriculture and the Congressional Library is being arranged.

The book room and the reading room in the Home Building have served the needs of the library to this date, but larger quarters will greatly facilitate the work of the teachers and experiment station officers, and will furnish needed opportunities for students in special as well as as those in the regular courses to consult agricultural literature.



HORTICULTURE BUILDING.

The College of Agriculture.

THE FACULTY.

Cyrus Northrop, LL. D., *President.*
Wm. M. Liggett, *Dean.*
Samuel B. Green, B. S., *Professor of Horticulture and Forestry.*
Harry Snyder, B. S., *Professor of Agricultural Chemistry.*
T. L. Haecker, *Professor of Dairy Husbandry.*
M. H. Reynolds, M. D., V. M., *Professor of Veterinary Medicine and Surgery.*
Willet M. Hays, M. Agr., *Professor of Agriculture.*
Andrew Boss, *Associate Professor of Agriculture, in charge of Live Stock.*
Virginia C. Meredith, *Professor of Home Economics.*
Juniata L. Shepperd, *Household Science.*
Frederick L. Washburn, M. A., *Professor of Entomology.*
Frederick D. Tucker, B. A., *Principal, School of Agriculture.*

PURPOSE AND SCOPE OF THE COLLEGE COURSE.

The college course in agriculture is designed for those graduates of the school of agriculture, and students from other institutions equally well prepared, who desire further instruction in practical agricultural science, in the sciences related to agriculture, and in literature and the arts. Since all students who enter this course have had the technical, scientific and general work offered in the school of agriculture, the college course includes only advanced work of a collegiate grade. This course designs to efficiently prepare students for either farm life, or for the work of the agricultural specialist. It emphasizes the importance of plant and animal production and the up-building of rural homes and farm life, while the biological and physical sciences are made prominent.

Following the four years of preparation in practical agricultural lines in the school of agriculture, the freshman and sophomore years are devoted largely to the study of the sciences. The technical subjects relating to agriculture and household economics are mainly offered as electives in the junior the senior years, when the freedom for election enables the student to choose as a specialty a major science, or an agricultural or a household subject around which to group related elective subjects. The elective courses during the last two years give an opportunity for further culture in literary and philosophical lines and for becoming more proficient in scientific research work in some of the many problems pressing for solution in the development of the state and national agricultural experiment stations. The instruction in the various technical agricultural and household divisions in the college course is for the most part a continuation of the work in these subjects in the school of agriculture, each subject being treated from a more technical standpoint. Students who have first graduated from the agricultural school are ready in their junior and senior years to elect specialities for study and research work along lines in which they may hope to work after graduation.

Students who have taken the eight years required in the school and college course are a unit in believing that none too long a time is required for graduation. A number of the graduates of this course enter for graduate work, as do also graduates of other agricultural colleges.

There is a growing demand for men and women thoroughly trained in agriculture and household economics. The United States Department of Agriculture and numerous experiment stations and agricultural colleges are in constant communication with the department of agriculture, seeking men and women who are graduates of the college course. Agricultural papers, large farms, seed firms and manufacturers of flour are on the lookout for men and women especially qualified. Institutional positions in household economics are opening to women prepared to manage the homes of students and others collected in large institutions. The world has learned the wonderful value of trained specialists in agriculture and in home making, and the United States government, the state, and large institutions generally, which deal with farming and home making, offer great opportunities for graduates of the college of agriculture.

REQUIREMENTS FOR ADMISSION.

For graduates of the School of Agriculture—Graduates of the school of agriculture, who have completed the studies prescribed in the intermediate course, or fourth year, are admitted to the freshman class. Graduates of state high schools, normal schools or other schools of equal standing, are admitted to the freshman class after pursuing such studies for one year in the school of agriculture as the faculty may require. Before graduation, however, all of the required work of the school of agriculture must be completed.

Students from other colleges and universities—Graduates from other colleges and universities may be admitted upon presentation of certificates, and will receive credit from the several professors for all work satisfactorily completed of similar character and grade to that given in this course. Before graduation, however, each student must complete all work required in the school of agriculture.

Special students—Graduates of the school of agriculture may be admitted as special students and be allowed to pursue such studies in the college of agriculture as are approved by the faculty.

REQUIREMENTS FOR GRADUATION.

After the completion of the prescribed course of study, including all of the required work and the requisite amount of elective work, students will be recommended for graduation with the degree of bachelor of agriculture.

COURSE OF STUDY.

FRESHMAN YEAR.

1st Semester.	2d Semester.
Elective from college of agriculture, 4.	Elective from college of agriculture, 4.
Drawing, 4.	Chemistry, 2.
German, 4.	Trigonometry, 2.
Higher Algebra, 4.	German, 4.
	Surveying and platting or (2) Rhetoric (4).
(1) Military Drill, 2.	(1) Military Drill, 2.
(2) Physical Culture, 2	(2) Physical Culture, 2.

SOPHOMORE YEAR.

1st Semester.	2d Semester.
Botany or Zoology or Psychology, 4.	Botany or Zoology or Logic, 4.
Chemistry, 4.	Chemistry, 4.
German, 4.	German or English or History, 4.
Elective, 4.	Elective, 4.
(1) Military Drill, 2.	(1) Military Drill, 2.
(2) Physical Culture, 2.	(2) Physical Culture, 2.
Rhetorical work, 1.	Rhetorical work, 1.

In the junior and senior years, the work is elective. Sixteen semesters are required.

Men are required to elect eight semesters from the courses offered in the college of agriculture, and eight semesters from the following subjects in the college of science, literature and the arts: Animal biology, botany, chemistry, physics, mathematics, philosophy, engineering, English, English literature, geology, mineralogy, political economy, history, astronomy, pedagogy, psychology, history of philosophy, Scandinavian, French, German, social philosophy, elements of contracts, Commentaries of Blackstone.

Women are required to elect during the junior and senior years, four full courses from the following: history, English literature, rhetoric, philosophy and French; and the equivalent of six other full courses from among subjects given in the college of science, literature and the arts, as above enumerated; and the equivalent of six full courses offered in the college of agriculture. Women who are sufficiently advanced may study music or art during the senior year, provided that no student may receive more than two semester credits in music and art together.

The student shall spend four hours per week in agricultural or (2) household practicums during each of four semesters, two semesters of which shall be in the freshman and sophomore years.

All students must advise with the dean or the committee on college and and graduate work concerning all electives. No instructor shall allow any student to enter any course until such course is properly entered upon the student's registration card by the registrar of the University, and no credit shall be given for subjects in which the student has not been previously registered.

COURSES OF INSTRUCTION IN THE COLLEGE COURSE

AGRICULTURE.

Equipment.—In the college course the general equipment of the University Farm is available for class and special instruction and for practice work. A seed breeding laboratory furnishes facilities for special instruction in field seeds and in laboratory work in plant breeding. The plant breeding nurseries, the variety testing and the seed distribution afford facilities for instruction and practice to students especially interested in these lines of work. The experiments and records in field management, in agricultural statistics and cultivation experiments provide material and opportunities for study and for gaining experience. Instruments of precision make practical the instruction in planning farms, land drainage, road making, fence building, etc. The farms of the vicinity will serve as a basis for designing farm plans and farm business, and rural engineering problems can be worked out in nearby rural communities. Many useful samples, drawings, photographs and references are being collected. The exhibits of machinery at the state fair grounds adjoining university farm, and those on exhibition in the warehouses of Minneapolis and St. Paul, supplement the collection in use at the University farm. Students can study the merchandising in grain and the milling of the various grain products in the twin cities. Statistics relating to the cost and profit of each staple farm crop are being gathered.

A portion of the instruction in agriculture is in the form of lectures. The writing of papers on special subjects is made a prominent feature. Research work is arranged for in many cases, and practice work on the farm and in the laboratory is provided. The aim is to have students get experience in field agriculture both practical and experimental, and in demonstration instruction.

Course I. Field crops and seed. 1 semester, 02-03.

In this course are considered the botany, cultivation, use and place in the rotation of the various cereal, forage, root, fiber, sugar and miscellaneous crops. Special attention is given to the subjects of permanent, rotation, annual and shift pastures. and to soilage crops; to permanent and rotation meadows; and to the production and preservation of all kinds of dry-cured and ensilaged fodders. A thesis on one or more field crops is required of each student.

Course II. Breeding. 1 semester, 03-04.

Heredity; variation; science of breeding; breeding as an art; improvement by nature and under scientific experimentation; securing foundation stocks; value of very large numbers; immense value of the occasional individual which can transmit qualities of peculiar value; use of an ideal; use and misuse of the score card; both numerical and graphic; intrinsic qualities, fancy points and distinguishing marks; pedigree records of prepontency; fundamental principles underlying the arrangement of the record books; bibliography and terminology; study of the literature of breeding.

Botany of the reproductive organs of field crops; field crop nursery management; producing new qualities by hybridizing and by change of environment; hybridizing versus cross breeding, in-breeding and self fertilization; originating varieties and improving standard varieties; methods of disseminating new varieties; seed and plant introduction. Experimentation in the theories relating to heredity, variation and practical breeding; seed growing as a farm business; seed merchandising.

Course III. Rural engineering. ii semester, 02-03.
Subduing new prairie and timber soils; farm drainage; irrigation and irrigation works; tillage of crops; roads, their financial support, location, construction and maintenance; farm buildings; farm fences; farm implements and machinery.

Course IV. Agricultural economics. ii semester, 03-04.
Farm management; systems of farming; planning farms: fields, crops, stock, labor; farm finances, sales, prices; agricultural statistics, production, exports, wages; land laws, ownership, taxes, rental systems; transportation, mail facilities. technical education, agricultural pedagogics, farmers' organizations; relation of rural industries to other industries.

AGRICULTURAL PRACTICUMS.

Opportunities to gain practical experience, to acquire greater manual dexterity in doing farm work, to secure practice in conducting experiments andto get experience in teaching agricultural subjects. are offered to those who elect one or more of their four "practicums" in agriculture. Students should arrange early in their course for this work, as the opportunities in plant breeding, in rural engineering, in field crops, in agricultural statistics and in assisting instructors in the various courses are available only at irregular intervals and must be arranged for in advance.

ANIMAL HUSBANDRY.

Equipment, Representatives of some of the leading breeds of cattle, sheep and swine are kept at University farm. Each year a number of experiments are under way in the feeding of these classes of animals, and breeding experiments are also undertaken with sheep and swine and theoretical experiments with the smaller animals. Experiments in summer feeding cattle, sheep and swine wholly or in part on pasture are carried on each year. The new veterinary building provides a temporary live stock judging room. Herds of blooded stock near the institution, and the annual show of live stock at the state fair serve for extended observation of breeds and methods of management.

Course I. Stock breeding. One-half semester.
Discussion of the principles of stock breeding as affecting breed maintenance and breed formation; standards of excellence and comparison of standards of breeds: heredity and the influences affecting it; prepotency, fecundity and their relation to successful breeding; the influence of nutrition on animal growth and form and the effect of artificial conditions; early maturity; selection and pedigree.

Course II. Feeding animals. One-half semester.
The principles of nutrition and digestion as applied to economical production; feeding rations and nutritive ratios; feed stuffs and methods of feeding; feeding of breeding stock and show stock; management of animals during pasture, yard and stall feeding for the block; feeding for specific production of wool or flesh; selection of animals for the feed lot; stabling suitable for the various classes of live stock.

Course III. Stock judging. One-half semester.

This course is calculated to meet the needs of students desiring to become expert stock judges and of those who wish to study animal form with a view to becoming breeders of superior animals. Score card work in combination with the presence of living specimens is a feature of this course. Students are drilled in judging from the standpoints of breed, type, form, stamina, quality, breeding capacity, suitability for feeding and for general and specific production. Special opportunities are given for judging live animals fitted for the block and in judging the dressed carcasses after slaughter, thus determining by observation the quality of animals judged.

LIVE STOCK PRACTICUMS.

Feeding and stable management of cattle, horses, sheep and swine; recording and calculating amounts of pasturage obtained from different forage crops, keeping herd records, writing pedigrees and recording animals; calculating feeding records and cost of production; mechanical analysis of carcasses of animals to determine total amount of meat, and proportionate amounts of fat and lean; determinations of fat and lean meat with especially designed apparatus; calculating percentages of different parts of the carcasses.

AGRICULTURAL CHEMISTRY.

Equipment.—The laboratory is equipped with modern apparatus for the analyses of soils, fruits and agricultural products. The equipment contains a Berthelot-Atwater calorimeter for the determination of the caloric value of foods, apparatus for the chemical and physical analysis of soils, an electrical apparatus for determining the resistance of soils to soluble salts, and the necessary facilities for food investigations. Special facilities are offered in soil investigations, and in the analysis and testing of wheat, flour and cereal products for commercial purposes.

In all of the laboratory courses in agricultural chemistry, a fee is charged to cover the cost of material used, and breakage. The student is assigned a certain amount of apparatus and material for which he gives a receipt, and deposits $3. with the accountant before beginning work. All apparatus returned in good condition at the close of the term, is credited to the student's account upon settlement.

Two and one-half semesters of chemistry are required in the freshman and sophomore years. All other courses are elective.

Course I. (*a*) *General agricultural chemistry.* Freshman ii, one-half semester.

Recitations, lectures and laboratory practice. Particular atttention is given to the study of the elements and compounds which are of the most imortance in agriculture. The laws governing the combination of the elements by weight and volume are illustrated by numerous problems. The writing of equations, chemical nomenclature, and the periodic system of classifying the elements are prominent features of the work. In the laboratory, experiments are performed illustrating the geneal laws of chemistry which have a bearing upon animal and plant life.

(*b*) A contiunation of *I* (*a*). Sophomore i semester.

Course II, Agricultural qualitative analysis. Sophomore, ii.

This course is arranged to meet the wants of agricultural students. Six hours per week are given to the laboratory work and one period to a lecture and recitation. The writing of equations and the study of principles involved in the separation of the various groups and individual compounds of elements are characteristic features of this work. It is the object of this course to familiarize the student with the processes employed in qualitative analysis so that he may be able to determine the composition of all ordinary substances, particularly of those that are of the most importance in agriculture.

Course III. Agricultural quantitative analysis. *Junior or senior.* i semester.
An elementary course in qualitative analysis. The principles involved in gravimetric and volumetric analysis are studied. Three periods per week are given to laboratory work and one period to a recitation and lecture. The work includes the gravimetric and volumetric determinations of iron, acidimetry and alkalimetry, the gravimetric determination of phosphorous pentoxide, the volumetric determination of calcium oxide and determination of nitrogen and potassium oxide. The object of this course is to prepare the student for special work in agricultural chemistry, and is required of all students who elect either courses vi or vii.

Course IV. The chemistry of foods. One-half semester.
Lectures. This course treats of the chemistry of human and animal foods, the chemistry of plant growth, the composition and food value of the various organic compounds contained in plants, the influences which soil and climate exert upon plant growth and the various factors which influence the value and composition of farm crops, The chemistry of human and animal nutrition is also considered, It is the object of this course to familiarize the student with the more recent investigations which have a bearing upon the chemistry of human and animal foods and to enable him to utilize these results to the best advantage in the production and use of foods. Ample facilities are offered in both laboratory and library for the study of this subject. (Given only in alternate years. Given in 1902.)

Course V. The chemistry of soils and fertilizers. *One-half semester ii.*
Lectures. The chemical changes that take place in the soil; the various sources of plant food; the power which crops possess of obtaining food from the soil; nitrification; the laws governing the increase and decrease of the soil nitrogen and the organic compounds of the soil and the part which they take in fertility—are some of the more important topics considered. The influence which various methods of farming have upon fertility of the soil and the best methods for conserving fertility are studied. The subject of judging, rating and scaling soils forms a part of the work. (Given only in alternate years. Given in 1903.)

Course VI. Laboratory practice. (a) The analysis of dairy products. *Semester i.*
This course including the proximate analysis of milk, butter and cheese, the determination of volatile fatty acids, iodine absorption number, the chemical and physical properties of fatty bodies and the determination of adulterated dairy products. This work is planned to meet the wants of those who wish to become familiar with the methods employed in investigations in dairy-chemistry.

(*b*). *The analysis of foods.* *One semester ii.*
This work includes the determinations of starch, sugar, cellulose, and the more common and important compounds found in food materials. Particular attention is given to the analysis of wheat and flour for commercial and technical purposes. Ample facilities are offered in the laboratory for this work. The object of this course is to familiarize the student with the methods which are employed in investigations relating to the chemistry and economy of human and animal foods.
Special attention is given to the study of methods of analysis and to the determination of compounds as pentosans, and the more important proteids in cereal products.

Course VII. The analysis of soils and fertilizers, (a) The chemical anlaysis of soils, i.
Laboratory practice. This course includes practice in the chemical analysis of soils and the study of the chemical methods employed in soil investigations. The course includes the analysis of soils by the use of strong and weak acid solvents. Particular attention is given to the study of the organic compounds, and experimental work is applied to field investigations.

(*b*) *The physical analysis of soils, ii,*
Laboratory practice in the physical analysis of soils by means of Hilgard's eleutrator, and the sedimentation methods as modified by the use of centrifugal apparatus.

Courses VII (a) and VII (b) are intended for students who desire to make a specialty of the subject of soils.

DAIRY HUSBANDRY.

Equipment—Students in the college course have the advantages of the equipment of the dairy school. The feeding and breeding experiments in the dairy division of the experiment station serve a most useful purpose in the collegiate instruction. The cordial relations existing between the department of agriculture and the other state institutions are often advantageous to college students well advanced in dairy work.

Representatives of several breeds of cattle are kept for class use. Herds in the vicinity and those shown at the state fair are useful to students in this course. The dairy exhibit at the state fair and the state butter and cheese contests in St. Paul, under the auspices of the State Dairy and Food Commission, are points of interest and value.

Course I. Dairy stock and dairy farm management. *One semester '02-'03*
Lectures, first semester, three hours per week. Practice work one hour per week. This course is given during the first semester of the junior year. The lectures cover the breeding, rearing and management of dairy stock, the points and characteristics essential in animals intended for the dairy, practice work in judging dairy stock, and the management of the dairy herd.

Course II. Feeds and feeding. *One semester*
This course consists of lectures covering scientific and practical questions underlying the principles of feeding. Practice work is given in formulating rations, in estimating the comparative value of food stuffs and in other problems connected with the subject. (Given in years beginning with even numbers.)

Course III. Farm dairying. *One-half semester. '03-'04.*
Lectures and practice work, two hours per week.
In this course the student receives lectures on milk, its care, the various methods of creaming it, care of the cream, and the manufacture of butter and sweet curd cheese, A student taking this course devotes the greater portion of his time to practice work in the "farm dairy room."

Course IV. Factory course in butter and cheese.
This course is offered in December of each year. The work comprises two lectures a day, one on butter and one on cheese, and practice work two afternoons a week in butter making and two afternoons in cheese making. (Any student may take either part of this course and obtain credit for a half semesters' work.)

DAIRY PRACTICUMS.

Students are offered training two semesters in compounding rations, feeding cows, rearing calves, milking and many other details in the management of the dairy herd; operting hand separators, and other modern farm dairy appliances, the manufacture of butter and cheese and work in the dairy laboratories.

ENTOMOLOGY.

The study of entomology will be of a practical nature and only sufficient work will be given in dissecting and classifying insects to enable the student to recognize them as being useful, injurious or indifferent to agriculture and horticulture. The various artificial remedies and insecticides known to be of benefit will be discussed, as well as natural remedies based upon the life history of the insects. Injurious and beneficial insects found in Minnesota will be considered, with a view of fighting the former and protecting the latter. The relationship existing between insects and man, between insects and insects, and between insects and plants will be studied in detail. Students wishing to make a special study of economic entomology can find work in the laboratory during the summer, providing they show aptitude for such work and already possess the preliminary training.

HOME ECONOMICS.

This course is intended to give breadth, strength and thoroughness to the concept of the home, and also an appreciation of its privileges as a career for educated women.

Course I.

Lectures once a week during one semester of the junior year. The evolution of the home, the family as a social and economic institution; the relation of the home to civic life; the home as a place and an opportunity for the right development of the physical and spiritual natures.

Course II.

Lectures once a week during one semester of the senior year; home administration; the organization of a home; generic lines of expenditure; domestic service; and disposition of waste.

HORTICULTURE.

Course I. Fruit growing. *One-half semester. '02-'03.*

Lectures. The study of the geography of fruit growing; outlook for fruit growing; planting, tilling and fertilizing of fruit lands; diseases and insects injurious to fruits; spraying; harvesting and marketing; varieties of vegetables.

Course II. Vegetable growing. *One-half semester. '02-'03.*

Lectures. Geography of vegetable growing; tilling and fertilizing vegetable lands; irrigation and rotation of crops; seed growing and seed testing; vegetables under glass; pollination; diseases and insects injurious to vegetables and their prevention; harvesting and marketing varieties of vegetables

Course III. Green houses and their management. *One-half semester '02-'03.*

Lectures and laboratory work. Green house instruction and management, temperature, soil, watering, benches; propagation by seeds, cuttings, layers and graftage: prevention of diseases and extermination of insects injurious to vegetables; rest and growth periods of plants; plants for greenhouse cultivation.

Course IV. Nursery work. *One-half semester. '02.'03;*

Lectures and laboratory work. Seedage, layerage, cuttage, graftage, planting, pruning, thinning, storage of nursery stock, tillage of nursery lands; insects, diseases injurous to the nurseries and their prevention.

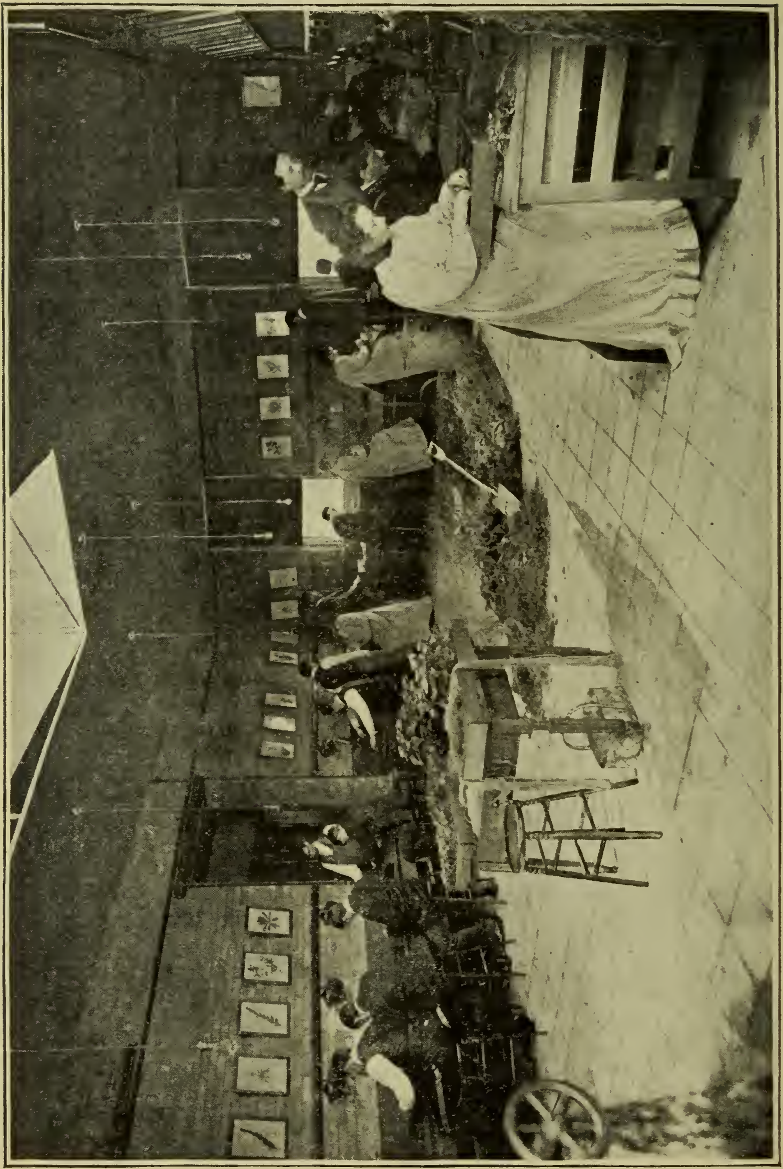
Course V. Plant breeding. *One-half semester '02-'03.*

Lectures and laboratory work. The fact and philosophy of variation; crossing of plants; origination of domestic varieties.

Course VI. Floriculture. *'03-'04.*

This course will include the work outlined in course III, but in addition, instruction will be given in the growing of flowers in the open borders in summer, and practical work in this line will be required.

Course VII. Pomology. *'02-'03.*



LABORATORY WORK IN HORTICULTURE.

FORESTRY.

Course I. Forest influences. *One-half semester.*

Course II. Sylviculture. *'02-'03.*
Lectures and field work. One-half semester.

Course III. Forestry mathematics. *One semester '02-'03.*
Including valuation surveys, stem analyses snd practice in scaling logs and lumber.

Course IV. Lectures and field work. *One-half semester '02-'03.*
Lumbering in Minnesota; forest management.

Course V. Lectures and research work. *One-half semester '02-'03.*
The forest situation in this country and its literature.

HORTICULTURAL PRACTICUMS.

Practicums are offered in forestry, nursery work, greenhouse management, general horticulture and landscape gardening. Students desiring this work should arrange for it early in their course.

HOUSEHOLD SCIENCE.

The work for collegiate classes is a continuation of the instruction given in the school of agriculture, but goes more into detail than in the school course. While the home needs are first considered, attention is given to the supply and preparation of food in public institutions, boarding houses, restaurants and hotels; and the laundry.

Equipment. The rooms for instruction in cooking, dining room work and laundering, contain the necessary appliances for manual practice and for demonstration lectures. Specimens of manufactured foods, samples of cooking and laundering utensils and materials, and of dining room and kitchen furniture are provided. The facilities of the city markets give practice in marketing. The proximity of Minneapolis and St. Paul, in which are found large flour mills, manufactories of cereal foods, canning and pickling factories, and other establishments which prepare food stuffs, makes it possible for the classes to visit many places where facts of value are learned. The large public dining rooms with their kitchens, and the commercial laundries also offer opportunities for gaining valuable practical knowledge in these branches of household science. The instruction in the physical and biological sciences in the college of science, literature and the arts, and also the instruction in the college of agriculture supplements the collegiate work given in household science.

Course I. Food economics. *One semester*
(1) Selection of food materials; marketing; buying by sample; cost and value; quality as to freshness, flavor, etc. (2) Storage and care of foods, care of cupboards, cellars, refrigerators. (3) Selection and preparation of foods for large numbers; equipment of large kitchens, serving rooms and dining rooms. (4) Kitchen laboratories, arrangements, equipment and methods of directing practice work in cooking.
Preparation of foods: (1) Meat products, as beef tea, beef powder and beef extracts; (2) cereal products and materials made from flours and meals, methods of ærating dough, leavening agents, etc.; (3) beverages, as cocoa and koumiss; (4)

condiments and spices; (5) confections, as candies and sweetmeats; (6) sweets, as sugars and syrups; (7) commercial bakery products, as breads, biscuits, crackers and pies; (8) preserving by drying, canning, refrigerating; and with preservatives, salts, sugars, spirits, fats and acids.

Course II. Management of kitchen and dining room. One semester.

(1) The kitchen equipment; (2) kitchen marketing; (3) foods from the kitchen garden; (4) care of the kitchen; (5) disposition and utilization of kitchen wastes. The dining room: (1) equipment, furniture, decorations, china, silver, glassware, linens. (2) Management; setting the table; garnishing and table decorations.

(3) Table service; duties of the host and hostess; carving and serving, reception, refreshments, etc.

Household inventories; bills of fare and dietaries, in rural homes, in urban homes, in public institutions, in boarding houses, in restaurants and hotels.

Fancy cookery; meat dishes, vegetable dishes, fruit dishes, pastries, ices, candies, sweetmeats, chafing dish cookery.

Course III. Laundering. One-half semester.

Removing stains, dyeing, setting colors, cleaning delicate fabrics, as silks, laces and fine wools; the use of cleaning agents, soaps, volatile oils and other chemicals; starches and blueing.

Commercial laundering and cleaning; power washing and ironing machinery, drying apparatus; gathering, distributing, accounts, etc.

PRACTICUMS.

HOUSEHOLD SCIENCE.

Students in the college course are given opportunities to gain practical experience in cooking, laundering, and instruction. This division has charge of the large dining hall, where students may gain experience in supplying food to large numbers, to invalids, and in preparing meals for large delegations, putting up lunches, etc. Practice work is provided in preparing refreshments and dinners, also normal practice, for collegiate students who may sometimes help give instruction to the large classes of girls in the school of agriculture.

VETERINARY MEDICINE AND SURGERY.

The new veterinary building gives ample facilities for laboratory and clinical work. The hospital furnishes a wide variety of cases for study and demonstration. The dissecting room affords material and opportunity for studying the digestive organs and locomotor apparatus, and museum materials are being collected.

Instruction is given by text-book, lectures, collateral reading and by practice work in the hospital. The lectures are illustrated by means of skeletons, manikins, charts and by the living animal. Anatomy of the digestive organs and the higher physiology of digestion are given prominence in this work. Theory and practice of medicine are carried further than in the school of agriculture course. Infectious diseases of domestic animals are studied with references to causes, recognition, prevention and methods of control. Certain medicines which the intelligent stockman should understand are studied with reference to uses, doses and methods of administration. The work in this department continues through two semesters.

Course I. The muscular system. i semester, '02-'03.

Including muscle currents results of contraction, muscle fatigue and laws of muscular work; the nervous system, including irritability of nerves, electric phenomena of nerves, reflex action, and sympathetic nervous system; physiology of the skin and nitrogen excreting apparatus; and advanced study of the veterinary physiology of digestion, taking up the digestive fluids, nervous mechanism of digestion, absorption and digestion of grains and fodders. It also includes a study of body nutrition, body income and expenditures, sources of heat supply and heat loss, and metabolism. Veterinary Physiology, by F. Smith, is used as a text and guide for this work in course I. but students are required to do collateral reading.

Course II. Locomotar apparatus. i. semester, *'03-'04.*

This course includes a study of the locomotor apparatus, including shoeing, diagnosis and treatment of common forms of lameness; diagnosis and treatment of common diseases; common medicines in their doses, uses, dangers and methods of administration.

COLLEGE GRADUATE WORK.

Special facilities are offered to graduate students from this and other agricultural colleges who wish to become familiar with methods employed in experiment station work, and to pursue their collegiate studies further. Courses for major and minor subjects may be arranged by consulting the professors in the different departments. Students who enter for advanced degrees register with the committee of the college of agriculture and must take their major subjects in the college of agriculture, but they may take one or both of their two minor subjects in the college of science, literature and the arts at the University campus. Graduate students registered with the committee on graduate studies in the college of science, literature and the arts may take one or both of their minor subjects in the college of agriculture.

I. The degree of Master of Agriculture will be conferred on a bachelor of this or any other agricultural college of equal grade who, not sooner than one year after graduation, if a resident graduate student at this agricultural college, shall pass an examination in certain prescribed lines of of study and present a staisfactory thesis.

II. All general regulations of the college of science, literature and the arts, governing candidates for the master's degree, method of selecting work, amount of work required, degree of proficiency expected, and the time and manner of conducting the examinations, shall apply to candidates for master's degrees in the college of agriculture.

III. The degree of Doctor of Philosophy will be conferred by the college of agriculture on bachelors of this or any other agricultural college of equal grade within not less than three years after graduation therefrom under conditions similar to those prescribed by the faculty of the college of science, literature and the arts.

IV. Applicants for graduate work in the college of agriculture shall be referred to the dean of the department and to the committee on college and graduate work, which shall examine applicants and have general charge of graduate courses subject to the approval of the faculty.

Intermediate Year.

FOR GRADUATES OF THE SCHOOL OF AGRICULTURE WHO WISH TO ENTER THE COLLEGE COURSE.

The larger part of the studies in the school of agriculture are technical subjects in agriculture and home making and in related sciences. Graduates of the school who continue with the college course take a part of their work in the college of science, literature and the arts, where they are in classeswith students who have graduated in city high schools.

They find it necessary, therefore, to spend a year in the further study of general academic branches, that they may advantageously enter all classes. To meet the needs of those graduates who cannot better secure such instruction in high schools near their homes, an intermediate year has been provided. Graduates of city high schools, on the other hand, are required to spend one or two years in the school of agriculture before they enter the college course.

The following prescribed course, or its equivalent taken in some other school, is required of graduates of the school of agriculture to gain entrance into the college of agriculture:

FIRST TERM.	SECOND TERM.
Algebra, (5)	Algebra, (5)
Geometry, (5)	Geometry, (5)
English, (5)	English, (5)
General history, (4)	Economics, (4)

The courses in mathematics for the intermediate year cover Wells' New Higher Algebra from the highest common divisor to logarithms, and Wells' Essentials of Plane and Solid Geometry, beginning with Book III. The work preliminary to these courses is done by the student in the B and A years in the school of agriculture.

The course in English extends through both terms. Two periods a week are devoted to composition, with Scott & Denney's Composition-Rhetoric as a text-book, and three to the study of literature, which will also be made the basis of considerable written work. In the year 1901-2 the class studied characteristic works of the following authors: Shakespere, Bacon, Milton, Addison, Gray, Goldsmith, Burns, Wordsworth, Lamb, Macaulay, Ruskin, Browning and Tennyson. Individual members were assigned readings from various other authors.

General history is given during the fall term. Text-books, reference reading and lectures are employed. The aim is to make the student acquainted with the important epochs in the history of mankind. Especial attention is given to the social and political status of the tiller of the soil—to agricultural methods and conditions in different ages and nations.

In economics it is the purpose to introduce the students to the essential principles of the subject and to prepare them for further study. Instruction is given by means of text-books, reference reading and lectures. Problems of rural life and the relation of the farmer to commerce, finance and public welfare are discussed.

Members of the A. class in the school of agriculture, who have a light program, may be registered for one or more subjects in this intermediate year.

The School of Agriculture.

FACULTY.

Cyrus Northrop, LL. D., *President.*
William M. Liggett, *Dean.*
Frederick D. Tucker, B. A., *Principal, Mathematics, General History, Economics.*
Samuel B. Green, B. S., *Horticulture, Forestry.*
Charles R. Aldrich, *Drawing, Farm Buildings.*
William Robertson, B. S.. *Agricultural Physics.*
J. A. Vye, *Penmanship, Accounts.*
Harry Snyder, B. S., *Agricultural Chemistry.*
T. L. Haecker, *Dairy Husbandry.*
M. H. Reynolds, M. D., V. M., *Comparative Physiology, Veterinary Science.*
Willet M. Hays, M. Agr., *Agriculture.*
Thomas Shaw, *Lecturer, Live Stock.*
J. M. Drew, *Blacksmithing, Poultry.*
Andrew Boss, *Animal Husbandry.*
William Boss, *Carpentry, Power Machinery.*
E. W. Mahood, M. A., *Algebra, Civics, and Director of Gymnasium.*
Juniata L. Shepperd M. A , *Cooking, Laundering.*
Margaret Blair, *Sewing.*
Virginia C. Meredith, *Preceptress, Home Economics.*
Chas. F. Keyes, A. B., *Registrar, Geography, U. S. History.*
Sophie L. Pendergast, B. L , *English* (Resigned).
Hayden S. Cole, 1st Lieutenant, U. S. Army, *Military Science.*
William A. Wheeler, B. Agr., *Agricultural Botany.*
Frederick L. Washburn, M. A., *Zoology, Entomology.*
Catherine Comfort, B. L., *English.*

ASSISTANT INSTRUCTORS

Roger S. Mackintosh, B. Agr., *Horticulture.*
Ernest W. Major, B. Agr., *Dairying.*
John A. Hummel, B. Agr., *Agricultural Chemistry.*
Mary A. Bull, *Cooking, Laundering.*
Arthur C. Koerner, *Music.*
Grace L. Whitridge, *Physical Training.*
Clarence B. Randall, *Drawing, Farm Buildings.*
D. A. Gaumnitz, *Dressing and Curing Meats.*
Coates P. Bull, B. Agr., *Agriculture, Rural Engineering.*
Mary S. McIntyre B. S., *Librarian.*

When applying for admission or information address Frederick D. Tucker, Principal, St. Anthony Park, Minn.

OPENING.

The school year opens October 1st, 1902, and closes March 20, 1903, The fall term closes Friday, December 19th, and the winter term begins Monday, Dec. 29, giving a vacation of ten days. Owing to to the shortness of the school year, it is expected that students will be on hand the first day of the term, that registration may be completed and work be begun promptly. Students registered in the fall term will not be received after the first two days of the winter term, unless they present a reasonable excuse for such delay.

THE SCHOOL OF AGRICULTURE—ITS PURPOSE.

There are two distinct functions which are performed by the school of agriculture. It offers a practical course of study designed to fit young men and young women for successful farm life, and it serves as a preparatory school for the college of agriculture. Its place in the system is that of the secondary school and it is frequently referred to as the agricultural high school.

For the young people who cannot pursue the full college course the school supplies a training in the general branches supplementary to the grammar school work and a thorough course in the leading branches of agricultural knowledge put in practical form by means of the constant application of lessons in the field, laboratory, or workshop. The methods employed are eminently practical for the ordinary uses of farm life.

The details of this work, the division of the time for the various subjects, and the range of work required of the students will be found outlined in the following pages.

It is the aim of the school of agriculture to make good farmers and good citizens. The claim that education tends to take young men and women away from the farm is here combated by the creation of an atmosphere which constantly magnifies the occupation of the farmer, and brings clearly before the students the possibilities which lie before the intelligent and practical agriculturist.

The farm home and farm life are made attractive by the ever present example of what higher education, practical agricultural knowledge, and high standards of citizenship can make of the profession of farming. The young men are taught that farming is a pursuit offering the widest scope for their energies and talents, and as attractive remuneration as most classes of safe business. The young women learn the possibilities of elevating farm life and making farm homes most attractive.

The school, then, does not educate students "away from the farm." On the contrary it educates them towards the farm. This is proved by the fact that eighty two per cent of the students return to agricultural occupations after leaving school. The several hundred graduates of the school of agriculture, most of whom are living on Minnesota farms, are already proving the success of the principles and aims of the school by their active influence in developing the agricultural interests of the state.

The home life of the students at University farm is watched over by several members of the faculty, and it is the aim to provide such interests outside the regular school work as may assist in rounding out the characters of the young men and women. Literary societies afford opportunities for experience in writing, public speaking and debate. The faculty aid in giving receptions and in social gatherings which provide social experience. In the work of the Young Men's Christian Association and the Young Women's Christian Association there are opportunities for training in cooperative religious activity. Student and alumni clubs and organizations, and a progressive periodical "The Farm Students' Review" published by the alumni, are aids in learning how to work for the betterment of agricultural conditions.

Through its location adjacent to the chief cities of the state, the school affords to its students many chances to attend meetings of general or agricultural interest; to become acquainted with state institutions and official life; and generally to acquire a practical fund of information about affairs which will be of value in later years.

Through the endowments and appropriations of state and national government the school is maintained without tuition charge, and the faculty so conduct the cooperative arrangements for students that excellent board is secured at low rates.

The faculty also aids the students in the purchase of military suits, the rent of text books, and other matters of necessary expense.

The young men and women of the state who desire to become farm home-makers are cordially invited to enter the course at the school of agriculture. They are urged to come with suitable preparation—that is, the complete mastery of the common school branches; previous farm experience; and to come with the intention of earnest and conscientious work throughout the entire three years' course.

HOW TO GET TO THE SCHOOL.

Check your baggage to Minneapolis.

Wednesday and Thursday, October 1st and 2nd, members of the Y. M. C. A., wearing lettered badges will be at the Union Station in St. Paul, and at the Union, Milwaukee, Soo and St. Louis Stations in Minneapolis, to meet and direct new students.

Take the Como Interurban car from either St. Paul or Minneapolis and get off at Dooley avenue.

The school will transport trunks at the opening of the school from Minneapolis for 25 cents each. No charge will be made for the return of the baggage at the close of school provided it is ready to go on the regular days assigned.

ADMISSION FROM COUNTRY SCHOOLS.

Applicants for admission will be examined in English grammar, arithmetic, history of the United States, and geography, unless they present state certificates showing that they have completed the eighth grade work in these subjects.

Students from city or village schools will not be admitted except, in addition to the above requirements, they present certificates from the principals of such schools showing completion of eighth-grade work and honorable standing in deportment.

State High School board certificates are accepted for work in English, physiology, algebra, geometry and civics.

Applicants who cannot obtain instruction in the common branches at their home district may be provisionally admitted if they pass examinations in reading, letter writing, and arithmetic through fractions or bring certificates from their county superintendents. Such students must complete the preparatory work in one term.

Students who can complete the common branches in their home school will not be admitted provisionally.

Applicants for admission after the opening of the term will, in addition to the regular entrance examinations, be required to show proficiency in the work done by the class up to the time of their application. All who cannot enter by the first of November should wait until the beginning of the winter term.

EXPENSES.

The total expense for the year need not exceed $85. This amount does not include the cost of the required military suit for boys, traveling or personal expenses.

The cost to the student for board, heat, light and washing is the actual cost of maintaining the table and caring for the house. This does not exceed $3 per week. An assessment of $12 is made in advance for the purchase of provisions at cash prices. At the end of each month the exact cost of board is calculated and an assessment made. At the final settlement the $12 assessed the student when he first entered the school is credited to his board account. The culinary department is managed by an experienced matron and all the buildings are under the supervision of the dean. The buildings are all lighted with electric lights and warmed by steam. The sleeping-rooms are each furnished with a bedstead, mattress, dressing bureau, chair and table.

No deductions in charges are made for absence of less than four days. If students are compelled to be absent for that length of time they will be allowed half rates, *if they arrange with the matron before leaving.*

Text-books are furnished at a term rental of $1 to students who do not desire to purchase.

FEES.—Each student pays an incidental fee of $1.50 per term, and also pays for breakages of apparatus used in practical work.

A competent nurse is kept on the ground to care for the sick. To meet this expense each student is charged a fee of 50c per term.

DEPOSIT.—In addition to the assessment of $12 for board, a deposit of $5 is required of each student as a guaranty for the return of all books and other articles borrowed.

MONEY REQUIRED.—On entering school the student must make a payment of $20; $12 on board, $5 deposit, $1 book rent, $1.50 fee and hospital fee 50c. If books are purchased on entering no rental is charged.

MILITARY DRILL UNIFORM.—All male students are required to provide themselves with the prescribed uniform, which consists of navy blue blouse, trousers and cap, and is as neat and economical a dress as the student can obtain. The suit complete, to measure, will be furnished under special contact for $11.25.

Each student furnishes four sheets, one pair of blankets, one quilt, one bed spread, one pillow, three pillow cases, towels, comb and brush.

An assignment of rooms will be made at 9 a. m. commencement day and will hold good only until 8 p. m. the first day of the following term, when the student's presence will be necessary to make good his claim.

Students wishing to retain their rooms after vacation must be on hand when the second term opens, or pay one-half the price of board and room for the time they are late.

Students arriving after the dormitories are filled, will be compelled to find rooms elsewhere at an additional cost of 50c per week.

REQUIREMENTS FOR GRADUATION.

First—The completion of the prescribed course of study with an honorable standing in deportment.

Second—An essay of not less than one thousand words upon a topic connected with agriculture or home economics.

Third—For young men, a practical experience in field work at the University farm or elsewhere, as shall appear in reports received from responsible sources.

STUDENTS' DEBATING SOCIETIES.

Societies for the purpose of improvement in elocution and debate and for obtaining instruction in the form of lectures give excellent opportunities for entertainment and culture.

LECTURE COURSE.

During the school year a lecture and entertainment course consisting of six lectures and concerts is given in the chapel at a cost of 75 cents for the series. The best talent is secured and the course is both instructive and elevating.

The past year the following course was given:

October 10. "The American Home," Rev. Thomas McClary;" Oct. 17, "Wm Morris, or the Gospel of Work," Elbert Hubbard; Nov. 1, Concert, Instrumental and Vocal, Parker Concert Co.; Jan. 16, "Value of Life and Opportunity," Rev. Norman Bartlett; Feb. 12, "Hickory Farm,"—Humorous, Melvin Robinson; March 6, "Joy of Farm Life," Rev. J. M. Cleary.

STUDENTS' CHRISTIAN ASSOCIATIONS.

The Young Men's and Young Women's Christian Associations have for their objects, social fellowship and moral and spiritual development. To this end two receptions are held each year, and each week Bible classes, a general religious service and mid-week prayer meetings are carried on. The associations are non-sectarian so that all students may find in them an opportunity for Christian growth and mutual helpfulness.

ATHLETIC ASSOCIATION.

The students have a well-organized athletic association and a well-equipped gymnasium. A competent instructor is in charge each evening. An opportunity is thus given for a healthful amusement and for needed physical exercise.

COURSE OF STUDY.

FIRST (C) YEAR.

FIRST TERM.

Agricultural Botany [5]
*Drawing [2]
Music and Gymnasium work [2]
English [5]

*Blacksmithing [2½]
*Carpentry [2½]
Military Drill [2]
Agriculture [3]

or

*Laundering [1]
Physical Culture [2]
*Sewing [3]
Social Culture [1]
Field Agriculture [3]

SECOND TERM.

Agricultural Botany [5]
*Farm Accounts [2½]
Music and Gymnasium work [2]
Comparative Physiology [5]
Study of Breeds [3]

*Carpentry [2½]
*Drawing (Farm Buildings) [2]
*Blacksmithing [2½]
Military Drill [2]

or

†Cooking [2]
*Drawing (Farm Houses) [2]
Physical Culture [2]

SECOND (B) YEAR

FIRSTTERM.

Agricultural Physics [5]

Dairy Chemistry [2]

*Dairy Husbandry [2½]
- Dairy Lectures
- Dairy Practice
- Dairy Breeds

Fruit Growing [3]
Music and Gymnasium work [2]
Algebra [5]

COURSE OF STUDY—*Continued.*

*Stock Judging [1] Breeding [2] Military Drill [2]	or	*Cooking [2] Household Art [1] Physical Culture [2] *Sewing [2]

SECOND TERM

Agricultural Chemistry [5]

Dairy Husbandry [2½]
- Dairy Stock Lectures
- Dairy Practice
- Dairy Feeding

Music and Gymnasium work [2]
Agricultural Physics [5]
Vegetable Gardening [3]

Field Crops [5] Military Drill [2]	or	*Cooking [2] Home Management [1] Physical Culture [2] *Sewing [2]

THIRD (A) YEAR.

FIRST TERM.

*Agricultural Chemistry [5]
Forestry [3]
Music and Gymnasium work [2]
Entomology and Zoology [5]
Poultry [3]

Handling Grain and Machinery [1] *Veterinary Science [2½]	or	*Cooking [2] *Sewing [2]

SECOND TERM.

Civics or Geometry [4]
Plant Propagation [3]

Dressing and Curing Meats [1] *Stock Judging [1] Feeding [3] Soils and Fertilizers [5] *Veterinary Science [2½]	or	Meats [1] Home Economy [1] *Cooking [3] Domestic Chemistry [3] Domestic Hygiene [1] *Sewing [3]

Figures in brackets indicate the number of hours per week in which the subject is pursued. All work in subjects marked thus extend through double time in the daily program

†Three periods.

ASSEMBLY.

On each school day at 11:40 a. m. the students assemble in the chapel. After the opening exercises brief talks are given by the principal, members of the faculty, and invited guests.

Members of the graduating class will, at this period, discuss the best books in literature and articles on public questions which appear in the leading magazines.

This plan gives to the students, in the course of the year, many things which will strengthen their lives for meeting the demands of citizenship in the rural communities.

SCHOOL OF AGRICULTURE—PROGRAM, FALL TERM, 1902.

INSTRUCTOR.	8:15-9:00	9:05-9:50	9:55-10:40	10:45-11:30	11:40	1:15-2:00	2:05-2:50	2:55-3:40	3:45-4:30	4:35-5:20
Aldrich					ASSEMBLY.	C Drawing 2, 5, or 1, 4		C Drawing 2, 5 or 1, 4		
Blair			B Sewing, 4, 5			C Sewing, 1, 3, 5 B Sewing, 2, 4		C Sewing 1, 3, 5 A Sewing 2, 4		
Boss, A						B Breeding, 2, 3. B Stock Judging, 4				
Boss, W		A Power of Machinery, o				C Carpentry 1, 4 or 2, 5	X Carp Lec 3	C Carpentry 1, 4 or 2, 5	Y Carp Lec 3	
Cole										C Milit'y, 1, 3 B " 2, 4
Comfort	G English	P & C III English 1, 2, 3	C I&IV Eng. 1, 2, 3	C II English		C Blacksmithing 1, 4 or 2, 5 X Lec., 3		C Blacksmithing 1, 4 or 2, 5 Y Lect 3		
Drew		A Poultry	A Poultry			A Forestry 1, 2, 3				
Green			II and IV B Fruit Gro'g 1, 2, 3	I and III B Fruit Gro'g 1, 2, 3		B Dairy Lecture 1,5	B Dairy Practice 1, 3 or 5			
Haecker						A Handing Grain and Machinery.				
Hays	C II and IV Agricul 1, 2, 3	C I Field Agriculture 1, 3, 5		C III Agriculture 1, 2, 3		P Geography	P History			
Keyes										C Music, 2, 4 A Music, 5 B Music, 1, 3
Koerner							Gymnasium Work at 8:00 p. m 1, 4 or 2, 5			
Mahood	II and IV B Algebra	I and III B Algebra	P I Arithm'c	P II Arithm'c						
Meredith				C Soc. Cult. 5			B Household Art 1			
Reynolds		C III Comp. Physiology	C I & IV Com Physiology					A Vet. Science 2, 4		
Robertson	B I Physics	B II Physics	B III Physics	B IV Physics						
Shaw	C II and IV Study of Breeds 1, 2, 3									
Shepperd						B Cooking 3 A Cooking 4, 5		C Laund. 1 or 2, or 3 or 4 B Cooking 5		
Snyder		A. Agr. Chem.	B II and IV Dairy Ch'y 4, 5	B I III D'ry Chem 4, 5 A I Lab Ag Chem 1,2,3,4				A II Agr. Chemistry 1, 3		
Tucker		G Geometry	G Gen. His.	G Algebra		Accounts 2, 5 or 1, 4 Y Lectures 3		Accounts 2, 5 or 1, 4 X Lectures 3		
Vye	Penmanship.									
Wheeler	C I Agr. Bot.	C II Agr. Botany	C III Agr Botany	C IV Agr. Botany						
Whitridge		C Physical Training 2, 4	B I, II Phy'c'l Training 2-4							
Washburn	A Entomology & Zoo.									

SCHOOL OF AGRICULTURE—PROGRAM, WINTER TERM, 1903.

INSTRUCTOR.	8:15-9:00	9:05-9:50	9:55-10:40.	10,45-11:30.	11:40	1:15-2:00	2:05-2:50	2:55-3:40.	3:45-4:30.	4:35-5:20
Aldrich......	....	....	....	....	ASSEMBLY.	C Drawing, 2, 5, or 1, 4.		C Drawing, 2, 5, or 1, 4.		....
Blair........	....	....	....	....		B Sewing, 2, 4.		A Sewing, 1, 3, 4.		....
Boss, A......	....	....	....	....		A. Feeding 2, 3, 5.	A. Dressing Cur. Meats 1	A. Stock Judging 1. A. Meats 2.		....
Boss, W......	....	....	....	....		C Carpentry	1, 4, or 2, 5. XCarp.Lec.3	C Carpentry, 1, 4, or 2, 5. ....Y. Carp. Lect. 3		....
Cole.........	....	....	....	....		....	....	....		C. Mili. 1 3.
Comfort......	G. English.	C. IV. Eng	C. I.IV. Eng.	C. II. Eng.		....	....	....		B. Mili. 2. 4.
Drew	....	....	....	....		C. Blacksmithing, 1, 4 or 2, 5. X. Blksm, Lect. 3........		C. Blacksmithing, 1, 4, or 2. 5. Y. Blksm. Lect. 3........		....
Green......	II. III, IV B Veg. Gard 2, 3, 4.	....	....	I. B. Veg. Gard 2, 3, 4.		A Plant Prop. Lab. 4.	A Plant Prop. Lec. 1.	A Plant Prop. Lab. 5.	....	....
Haecker......	....	....	....	....		B. Dairy Stk. Feeding, 1, 5.	.......B Dairy Practice, 1, 3 or 5........			....
Hays.......	II, IV. C Agr. 1, 2, 3.	III. B Field Crops.	II. IV. B. Field Corps.	....		....	....	....	....	....
Keyes........	....	G Geometry.	....	....		P Geog.	P History.	P History.		C. Mus. 2, 4.
Koerner......	....	....	....	....		....	....	....	....	A. Mus. 5.
Mahood......	P. I. Arith.	A Civics, 1, 2, 3, 4.	P. II, Arith.	A Civ. 1,2,3 4.		....	Gymnastic Work at 8:30 p. m., 1, 4, or 2, 5.			B. Mus. 1, 3.
Meredith.....	....	....	(B) Home Manage. 5.	A. Home Econ., 5.		....	....	....	....	....
Reynolds....	....	C. III. Physio.	C. I. Physiol.	....		....	....	A Vet. Sci., 5 pds 2,4.		....
Robertson...	B. I. Physics.	B. II Phys.	B. III Phys.	B. IV. Phys.		....	....	....	....	....
Shaw	C. II, IV. Study of B. 1, 2, 3.	C. I. Study of B. 1, 3, 5.	....	....		....		....	....	....
Shepperd....	....	....	....	....		A Cooking. 2, 3, 5.		B Cooking, 2, 3, 5. C Cook, 1. 4.		....
Snyder.....	A Domes. Chem., 3, 4, 5.	I. IV. B Agr. Chem.	Soils & Fert	II. III. B. Agr. Chm.		....	....	....	....	....
Tucker	....	A Geom. 1, 2, 3, 4.	G Economics.	G. Algebra.		.... C Accounts, 2, 5, or 1, 4, Y. Lect. 3.	G. Geom.	C Accounts, 2, 5, or 1. 4, X. Lect. 3.		....
Vye..........	Penmanship.	....	....	....						
Whitridge...	....	C. I. Phys. Tr. 2 4.	B. I. Phys. Tr. 2, 4.	....		....	....	....		....
Wheeler.....	C. I. Plant Study,	C. II. Plant Study.	C. III. Plant Study.	C. IV Plant Study		....	....	....		....

COURSES OF INSTRUCTION IN THE SCHOOL OF AGRICULTURE

AGRICULTURE.

The instruction in agriculture, as in horticulture, etc., continues throughout the course and is outlined as follows:

Course I (*C*) *Introductory agriculture:*

Soils; selecting and planning farms; subduing the fields; drainage; irrigation; fences; roads; buildings; water supply; groves and introductory lessons concerning farm business, farm life and the relations of general science to agriculture.

Course II. (*B*) *Field crops and farm management:*

Farm management: Remodeling farm plans; rotation of crops; manuring, production and management of farm manures, green manure crops, and the place of commercial fertilizers in field management in various parts of the state; farm administration, management of fields in relation to fertility, to weeds, to yields, to live stock and to profits.

Field crops:—Place in the rotation; preparation of the land; planting; cultivating; harvesting; storing and marketing of grains, field roots, fiber crops, sugar crops, grasses, clovers and other forage crops; planting, care and use of pastures and meadows.

Weeds:—Keeping weeds down by helpful crop rotations, careful field work, and good methods of farming generally; study of botany and habits of the various species of harmful weeds; methods of destroying each class of weeds.

Breeding:—Laws of heredity and variation; possibilities of increasing values; improvement and formation of varieties; general facts as to methods of breeding; specific plans of breeding leading field crops.

Course III. (*C*). *Field Agriculture.*

Selected portions of courses i and ii, for girls.

AGRICULTURAL CHEMISTRY.

One term is given to the study of the elements and compounds which are of most importance in agriculture. This work is planned to prepare the student for intelligent study of the subject of agricultural chemistry, particularly of the chemistry of foods, and of soils and fertilizers, and at the same time to familiarize the student with the more important chemical changes which take place in every day life. Laboratory practice forms a prominent feature of all of the work in agricultural chemistry.

ANIMAL HUSBANDRY.

Course I. (*C*)—*Study of breeds.*

This work covers a discussion of characteristics of the leading pedigreed breeds of beef cattle, sheep and swine adapted to northwestern conditions; the environments to which each breed is especially suited; and practice in the selection of animals that are representative of the various breeds.

Course II. (*B*)—*Breeding.*

Students receive instruction in the principles that govern breeding, in the influences that affect heredity, and also in the care and management of breeding stock.

Course III. (*C*)—*Feeding.*

The principles of feeding as applied to the production of horses, beef cattle, sheep and swine are taught. Special attention is given to the choice and preparation of foods for animals during different periods of growth and during the time they are used for breeding purposes and to summer feeding and pasturage. Practice is given in compounding rations that will include in the best manner the food stuffs commonly produced on the farm. As far as is practicable, these talks are illustrated by the presence of living specimens of the animals under discussion.

Course IV. (A)—Dressing and curing meats.

The instruction given the boys consists of demonstration lectures on the preparation of meat for farm use. They are required in addition to take two weeks practice work in dressing, cutting and curing such meat as is likely to be used on the farm. Work is also given them in selecting and judging fat stock, and in judging dressed meats.

The instruction given to the girls in the subject of meats pertains to the selection and value of different classes of meat, and to the best methods of curing and preserving.

STOCK JUDGING.

During the B. and A. years classes are arranged for work in stock judging in connection with courses II, III and IV. Score cards are used to an extent sufficient to familarize students with that method of judging, and special efforts are made to do systematic and closely critical work in the selection of animals representative of the breeds and for breeding purposes. Living specimens are used and rings will be made up for the student contests in stock judging. In connection with the work in dressing and curing meats, the judgment passed on live animals for the block is verified by score cards, judgment of the dressed carcasses and by actual block tests. These tests are made by the students and bring out the percentage of meat in each commercial cut of the carcass. The quality of meat is passed upon in this connection by experts, and a careful report made to ascertain the type of animals best calculated for the production of the most meat of the best quality.

THE MEAT CUTTING LABORATORY.

Course I. (*B*)—*Dairy chemistry.*

The chemical and allied changes which take place in the handling of milk and in its manufacture into butter and cheese, and the application of these principles to the production of milk and its products form the basis of this work.

Course II. (*B*)—*Chemistry of foods.*

The composition of plant and animal bodies, the chemistry of the plant and of its food and growth, the chemistry of animal nutrition, digestibility and value of foods, and the laws governing the economic uses of foods, are some of the subjects considered. The composition and the utilization of farm crops for food purposes, and the application of the principles of chemistry to plant and animal life form the basis of this work.

THE DINING HALL.

Course III. (*B*)—*Soils and fertilizers.*

The composition of soils, and their properties, the sources of plant food, the kinds and amounts of food required by crops and the best ways of supplying these demands, the various forms in which plant food exists in the soil, farm manures, their uses and action upon the soil, the income and outgo of fertility from the farm, soil exhaustion and soil improvement, the rotation of crops, as based upon the chemistry of soils and the principles governing the conservation of the fertility of the soil form the more important features of this subject.

Course IV (*a*) *Domestic chemistry.*

The combination of human foods to form balanced rations, dietary studies of families, cost and value of foods, losses in the cooking and preparation of foods, cereal food products, animal food products, adulteration of foods and their detection, fuels, soaps, dye stuffs and colors, composition of common household utesils, the household water supply, preparation of home made baking powders, bakers' chemicals, composition, food value and characteristics of tea, coffee, chocolate, cocoa, molasses, honey, vinegar and spices, the grading and testing of wheat flour and the chemistry of bread making, form the essential parts of this work.

ALGEBRA.

Algebra is required during the first term of the second year. This work covers Wells New Higher Algebra to highest common factor. Special attention is given to literal notation, negative numbers, the equation and factoring.

BLACKSMITHING.

The students are instructed in the management of the forge and fire, and in bending, shaping and welding iron and steel. They are required to make links, rings, hooks, bolts, clevises, whiffletree-irons, tongs, cold-chisels, punches; in short, to become familiar with all the operations necessary to enable them to do their own repair work when they return to the farm. Particular attention is given to rapid and accurate welding and to the shaping and tempering of steel tools. The forges used are such as any farmer can make for himself, and each student is taught to make his own tools, so that he will be able to furnish his shop with very little outlay.

CARPENTRY.

Instruction is given by means of text-books, lectures, and work in the shop and drawing room in the care and use of tools, including setting and filing saws, filing bits, grinding plane irons, chisels and other tools; also in laying out work and framing buildings. Methods of construction are illustrated by models and drawings. Various articles for use about the farm are manufactured by the students.

CIVICS.

During the last term of the course students receive instruction in this science, and graduate with a good understanding of the origin, necessity, nature and various forms of government, and the machinery employed to carry on public works, establish justice and provide for the common defense; of the organization and management of local institutions, the town, the village, the city, and the county; the manner in which states are created and the affairs administered; the three departments,—legislative, judicial and executive, and the functions of each; the interdependence of the state and its citizens, as well as the powers and obligations of each, by due attention to which the state may be strengthened and the condition of its citizens ameliorated.

The relation of the state to the general government; the constitution, and the powers it confers; and the provisions for amendments,—are taught. The more important principals of commercial law, including contracts, agency, partnership, corporations, and commercial paper, receive attention. Instruction is also given in the United States method of surveying public lands.

COOKING.

The course in cooking extends through five terms of the curriculum as given below, with the subjects covered in each term.

Course I (C) second term—Kitchen management; care of cooking utensils, glass, china and silverware; measuring and invoicing; cooking vegetables, cereals and breads.

Course II. (*B*) First term—Cooking meats, preserving fruits and vegetables.

Course III. (*B*) Second term—Eggs, beverages, soups, salads and table service.

Course IV. (*A*) First term—Marketing and care of foods; dairy dishes, made over dishes, invalid cooking.

Course V. (*A*) Second term—Desserts, food rations, dietaries, confections, bills of fare and dining room.

DAIRY HUSBANDRY.

Farm dairy lectures.—A course of lectures is given in farm dairying. giving instruction in the care of milk and utensils, explaining the principles involved in creaming milk by the gravity and centrifugal processes and giving full instruction in regard to running farm separators and the manufacture of butter and cheese in the farm dairy.

Dairy practice—Students receive practical training in the most advanced methods of creaming milk, ripening cream, churning, working and packing butter, the manufacture of sweet curd cheese, and measuring the value of milk by the Babcock test and lactometer. This practice work begins the third week of the first term and continues through the school year.

Dairy stock—During the last half of the first term students receive instruction in regard to characteristics of the various breeds of dairy cattle, their origin and comparative adaptability for the dairy. Lectures are given upon the points essential in animals intended for the dairy. The students have practice work in judging dairy stock.

Feeding—During the second term lectures are given covering both the scientific and practical phases underlying the principles of feeding. Practice work is given in compounding rations and estimating the comparative value of food stuffs.

DRAWING.

The student is taught the practical value of drawing for the purpose of designing and arranging buildings, machinery, etc. He makes drawings of the shop exercises then works from his own drawings, thereby learning the application.

Designs are made for dwellings, barns, out buildings, and machinery. As practical subjects for their designs students are requested to bring from home data for plans of buildings needed on their farms. Estimates are made of the amount of material required and cost of censtruction.

ENGLISH.

Course I. (*C*) The first year's work in English consists of almost daily practice in the simpler forms of composition and the study of the more important grammatical relations. Applicants for admission to the C class should be familiar with the inflections of nouns, pronouns and verbs, the definitions and classifications of phrases and clauses and the common case constructions.

Course II. (*B*) Once a month throughout the school year the members of the B class will prepare essays of about a thousand words, and submit them for criticism.

Course III. (*A*) During the year 1902-3 a series of literary programs will be presented in chapel by the members of the graduating class. The numbers will include abstracts of leading magazine articles, biographical sketches, book reviews and selections from fiction; special prominence will be given to authors depicting American life.

GIRL'S HOME BUILDING.

ENTOMOLOGY.

The class in entomology receives instruction of a practical nature. The course is divided as follows:

Classification of insects sufficientto enable the student to distinguish between useful and injurious insects and to apply remedies intelligently, as the remedies must be selected according to the kind of insect to be combated.

Insecticides and their application; the most approved methods of using arsenical poisons, kerosene emulsions, and other preparations,—are taught.

Natural remedies and nature's methods of preventing increase of injurious insects receive due attention so as to enable the student to apply their teachings. The relation of other animals to insects is also taught, so that the student may know both his friends and his foes. Special attention is given to injurious and useful insects of Minnesota.

GEOMETRY.

Geometry is offered in the second term of the third year, as an elective in place of civics to those who wish to prepare for a college course. This work covers the first two books of Wells' Essentials of Plane Geometry.

HOME ECONOMICS.

Course I. (*C*) *Social culture.*

A course of lectures is given on the usages of society including manners, behavior, the voice, conversation, forms of address, invitations, etc. Personal fitness for society is shown to depend upon attention to the laws of health and to personal habits as well as upon the refinement of a cultivated mind and sympathetic spirit. Suggestions are made in reference to reading, literary taste and the choice of books. Especial stress is given to the thought that family life ought to be the highest expression of good society and that next to the power of thinking correctly is the power of approaching others with ease and speaking with tactful directness.

Course II. (*B*) *Household art.*

Lectures upon the house and grounds, noting the distinctive character of the country home and opportunity for embellishment found in the surroundings. The intention is to show that thought and energy can accomplish as much or more than money in making a farm home attractive; also to show the importance of acquiring correct knowledge and correct taste in order to secure every possible convenience together with harmonious forms, colors and styles in the plan, finishings and furnishings of the house. The relation of beauty to use and the influence of surroundings upon life and character are considered in connection with the possibilities for improvement that may be found in simple and inexpensive methods.

Course III. (*B*)—*Home management.*

The subject includes both housekeeping and home-making and the instruction is based upon the belief that housekeeping is a business as important as it is difficult and that home-making is the noblest form of human endeavor. The care of the house and household belongings, of the food and the clothing, as well as the ordering of family life are considered in their relation to an adequate plan for home management. To start the student in the right way of becoming mistress of the business of housekeeping and home-making is the end sought. The practical benefit to be derived from the knowledge students gain in the cookery, sewing, dairy, laundry and other classes, is emphasized and shown in its relation to an adequate plan for the daily program for the home.

Course IV. (*A*)—*Home economy.*

The lectures are a study not only of the just proportion between expenditure and income, but of the definite proportion in the expenditures made for existence, comfort, culture and philanthropy. A study is made of the sources of income, especially of the income from the farm in the form of house, food and luxuries; the purchase of clothing, household stores and furnishings is considered from the standpoint of the suitable. The relation of cash and credit to cost is also considered. Attention is given to savings and forms of investment, a bank account and the use of a check book. Students are required to submit an account setting forth in detail the use of a certain named income expended in the support of a family for one year, embracing not only every item of necessary home expense, but also an outlay made for travel, luxuries, accident, sickness, or other emergencies. The habit of keeping a household account is calculated to strengthen the judgement in the wise use of money.

Course V. (A)—Domestic hygiene.

Several lectures by a physician will be given upon maidenhood, maternity and infancy. These special lectures will be supplemented by the regular lectures which consider the health of the family as dependent upon pure food, pure water, personal cleanliness and proper habits as well as upon heredity. The aim is to impress the truth that a knowledge of and obedience to the laws of hygiene are essential to the preservation as well as the restoration of health.

HORTICULTURE AND FORESTRY.

Course I (B)—Fruit growing is taught with reference to raising fruit for market.

Course II (B)—Vegetable gardening embraces the study of garden tillage, irrigation, and rotation of crops; transplanting; formation and care of hotbeds; study of garden insects; and the growing of various vegetable crops.

Course III (A)—Forestry includes the consideration of the formation and care of wind breaks and shelter belts; the laying out and planting of home grounds; discussion of the hardiness, habits, and value of our native and introduced trees; and the methods of propagating them.

Course IV (A)—Plant propagation—In this subject the principles underlying the development of cultivated varieties of plants and seed testing are taught; also the propagation of plants by seed, cuttings, grafting, and budding.

The work of the class room is illustrated by the orchards, nurseries, forest plantations, gardens and greenhouses on the grounds of the experiment station and by visits to commercial nurseries and greenhouses near by.

LAUNDERING.

In the first term of C year several lectures are given and practice work is provided in washing, ironing, starching, polishing, cleaning and pressing clothing.

MUSIC.

Instruction is given in this subject, not with the purpose of making trained musicians, but to introduce the students to the elementary principles of this art, and to develop in tbem a love for this most valuable factor in home and social life.

Illustrated lectures, in which music by the masters is used, are given at stated intervals.

PENMANSHIP AND ACCOUNTS.

In this department the student is taught to write a plain hand with rapidity and ease. The work in accounts is applied to the transactions which the student meets in the various duties on the farm. He is so taught to keep his accounts that he may know at any time the profit or loss of any department of his business, and is thus enabled to plan intelligently.

Attention is given to the different kinds of negotiable paper; the various forms of endorsements and their effect; business forms and correspondence. Everything is made plain and practical, and students can learn to keep accurately and neatly the accounts of an ordinary business.

PHYSICAL CULTURE.

The work in this department is particularly directed to the improvement of nutrition and the correction of faulty habits of carriage and posture, frequently the result of exercise taken in the performance of household tasks which have a tendency to produce overdevelopment of certain muscles, while leaving others almost unused. The course of study includes free gymnastics and the use of light apparatus, supplemented by movements taken from the Delsarte system of expression. There are two classes, one for elementary and the other for advanced work.

AGRICULTURAL PHYSICS.

The general principles of the science are taught, special stress being laid upon those which to the greatest extent enter into the business of the farmer. About half the time is devoted to experimental work, which includes capillarity of soil; diffusion and osmosis of gases and liquids; heating, lighting, and ventilation; farm machinery in particular, pumps, eveners,—especially three and four horse, pulleys, milk-testers, centrifugals, incubators, wind-mills, steam and gasoline engines; friction and lubricants; tensile strength of wire and binding twine of different grades; lightning and lightning protection. The foregoing indicates the character of the work, the attempt being to give the student an acquaintance with the laws of nature that he may act with reason and work to advantage.

COMPARATIVE PHYSIOLOGY.

During the first year students take one term of applied physiology, This is an effort to connect technical physiology with the necessities of every day life. The work includes a study of the general plan and structure of the body and the various individual tissues of which it is composed; also sources of heat and energy, digestion, and the relation of food materials to the various tissues of the body. Considerable attention is given to diseased and innutritious foods, food adulterations and narcotics. The circulation is studied with especial reference to the relation of the blood and lymph to tissue nutrition and tissue waste.

Accidents, including poisoning, are studied for the purpose of giving a practical knowledge of what to do in emergencies. Considerable attention is given to the subject of clothing, the various materials in use being considered with reference to fitness for special purposes. Some time is also given to the study of common physiology, of the organs of circulation, digestion, respiration, nervous system, and the relation of bacteria to the common diseases, especially such diseases as consumption, typhoid fever, etc. A brief study is also given to the subject of digestion in the lower animals.

The class work is illustrated by means of large charts, skeletons, manikins and dissections. Important points of difference between human and animal physiology are pointed out in preparation for the third year's work in the veterinary class. Matters of home and personal hygiene are interwoven with the physiology work.

AGRICULTURAL BOTANY.

This subject is taught with special reference to its bearing upon the everyday problems that present themselves to the farmer and gardener. It is profusely illustrated with flowers and plants from the greenhouse and nursery. Some instruction is given in the use of the compound microscope. Students are thus enabled to study intelligently, in an elementary way, the tissues of plants. By this means they get a clear idea of the general principles of plant structure and vegetable physiology.

POULTRY.

In the instruction in this subject the following will be considered; history and characteristics of the leading breeds of poultry; breeding, feeding, and management of fowls for eggs and for the market; planning, building, and arrangement of poultry houses; managing incubators and brooders. A model poultry house, containing pens of the most improved breeds, incubator cellar, workroom, etc., has been provided, where experimental work and practical instruction are carried on.

SEWING.

The course in sewing consists of five terms' work. During the first term the student receives instruction in the elements of sewing, including different stitches, seams, hems, darning, etc., also practical talks on the use and care of all the implements belonging to the sewing basket. The second years' work consists of cutting and making plain garments, drafting of underwear, children's clothing, shirt waists and cotton dresses, taught by a very simple method, using only the tape line and square.

The third year the more difficult work of dressmaking is taken up; drafting patterns, cutting and fitting of dresses. Lectures are given on textiles, wearing and selection of materials. The study of harmony of color is given special attention.

The course is designed to make each graduate capable of doing all kinds of sewing required in the home.

VETERNIARY SCIENCE.

During the A year the student takes up a course of study in veterinary medicine, the purpose of which is to fit him for intelligent care of his farm stock. In this course the teaching is done by means of lectures, disribution of mimeorgraphed lecture notes after each lecture, reviews and clinical work at the hospital maintained for this purpose. Lectures are illustrated by means of charts, manikin of horse, skeleton of horse, and various other appliances.

The lectures consists of a series on each of the following subjects: Elementary anatomy; elementary pathology; cause and prevention of diseases; diagnosis and treatment of common diseases, examination for soundness; and a final short course on common medicines, studying their effects, uses and doses. At the hospital clinics students are enabled to examine and care for a variety of cases and to learn the elements of diagnosis for the more common diseases and forms of lameness.

ZOOLOGY.

Chiefly Minnesota animals are considered: (1) their classsification; (2) their habits and food; (3) their relation to the farmer. To assist the students in their work, a museum has been started in which is shown the relation of Minnesota animals, birds, reptiles, etc., to agriculture. Soils, minerals, fossils, plants—both useful and injurious are also on exhibition.

CLASSIFICATION OF STUDENTS.

No student with incomplete C or preparatory work will be classified as an A.

No student with incomplete preparatory work will be classified as a B.

No student with incomplete C or preparatory work will be made a commissioned military officer.

Dairy School.

THE FACULTY.

CYRUS NORTHROP, LL. D., *President.*
WILLIAM M. LIGGETT, *Dean.*
T L. HAECKER, *Professor of Dairy Husbandry.*
HARRY SNYDER, B. S., *Dairy Chemistry.*
——————————*Bacteria in Dairy Products.*
W. M. HAYS, M, Agr., *Forage and Pastures.*
M. H. REYNOLDS, M. D.. V. M.. *Diseases of the Dairy Cow.*
J. A. VYE, *Creamery Records and Accounts.*
WM. ROBERTSON, B. S., *Care of Boiler and Engine.*
C. R. ALDRICH, *Dairy Buildings.*
J. M. DREW, *Silo and Stable Conveniences.*
B. D. WHITE, *Instructor in Creamery Management.*
A. W. PARKIN, *Instructor in Cheese Making.*
WM. BOSS, *Instructor in Practical Engineering.*
H. L. SONDERGAARD, *Assistant Instructor in Butter Making.*
SAMUEL HAUGDAHL, *Instructor in Cultures and Starters.*
JACOB LEHNHERR. *Instructor in Sweet Curd Cheese Work.*
E. W. MAJOR, B. Agr., *Instructor in Dairy Laboratory.*
——————————*Assistant in Dairy Laboratory.*

The next session of the Dairy School will begin November 24, 1902, and continue four weeks.

This course is designed to furnish persons who are actually engaged in the manufacture of butter and cheese, in creameries and cheese factories an opportunity to become more skilled in their work, and also to study the many problems which have a direct bearing upon the dairy industry. Recognizing the fact that such persons cannot be away from business for a long period, the term has been so arranged that the time of each student is fully occupied by lectures and actual work in the creamery training room every hour of every working day of the term.

The rapid growth of the dairy industry in the Northwest calls for a corresponding enlargment of the work in dairy instruction. To meet this want the dairy hall has been equipped with the latest and most improved machinery and all apparatus necessary to give instruction in the vaious lines of dairy work.

No pains will be spared to maintain the high standard which the school has attained. Each member of the faculty has special qualifications for the duties to which he has been assigned. The lecture course and practical instruction are arranged with special reference to giving the greatest amount of training and practice possible in a four week's session.

Large additions have been made to the equipment of the dairy hall in both butter and cheese departments; in fact, it has everything needed for conducting the work by the most approved methods.

Instruction is divided into six courses:

1st. Lectures covering the entire field of dairy husbandry.
2d. Practical work daily in the butter room.
3d. Practical work daily in the cheese room, where the manufacture of flats, cheddars, Swiss, brick, Edam, and Gouda cheese will be carried on.
4th. Practice work in the laboratory examining milk, making daily composite tests, and the pasteurization of milk and cream.
5th. Practical engineering, steam fitting and plumbing.
6th. Practical work in factory bookkeeping.
7th. Practice work with cultures and starters.

DAIRY HALL.

I.—LECTURES.

The course of sixty lectures furnishes in a plain and concise form the most valuable information for those who are interested in any branch of agriculture, covering, as it does, the most important points in the breeding, rearing, feeding and general management of dairy stock, the economical production of milk, growing and preserving of forage and grain crops, the management of meadows and pastures, managenent of barns, stables and yards, construction of silos, co-operative dairying, creamery and cheese factory management, judging and marketing dairy products, the chemistry of milk, dairy bacteriology, engineering, animal hygiene and treatment of the common diseases of the dairy cow.

II.—BUTTER MAKING.

The running of separators; ripening and churning of cream; the proper acidity of cream to secure best flavor: how to churn, wash and salt butter so as to avoid specks and mottles: to secure good grain and best methods of preparing for market—are some of the points which receive special attention. As all creamery men should be able to judge butter from a commercial standpoint, students are trained daily in the art of scoring butter by the score card.

III.—CHEESE MAKING.

The work in the cheese room is conducted on a large scale, including the manufacture of several brands of fancy cheese. The fact that there is a demand for these at highly remunerative prices has induced the Regents to provide the necessary means for carrying on this work.

A complete record of every step taken is required of each student. Here is a good opportunity for cheese makers to meet, investigate new methods, make experiments on doubtful points, compare notes, and thus gather in a few weeks knowledge that otherwise would take years to acquire.

IV.—MILK TESTING.

It has been found that the value of milk for both butter and cheese is measured by the per cent. of fat content, and nearly all our factories and creameries now base the payment for milk on the fat content. It is therefore necessary for every factoryman to familiarize himself with the best methods of milk testing. The chemist gives a general outline of the work, but in order that each student may have thorongh training in milk testing, daily exercise is given. Steam, turbine and hand power machines and other apparatus are provided and operated in the laboratory.

The pure and wholesome milk and cream supply for our cities is a matter of vital importance, and there is great need for improved methods of handling milk intended for this purpose. To meet this, milk and cream pasteurizing apparatus of the latest and most approved makes have been provided for the dairy school, and a few advanced students will be given instruction in this work.

V.—MOTIVE POWER.

The work in engineering consists of practical talks on the construction, care and management of creamery engines and boilers, pumps, injectors, heaters, etc., and work in the practice room.

In the practice room is provided an eight horse power simple, slide-valve engine, three types of boiler feed pump, two types of deep well pumps, one injector, two milk pumps, and a steam gauge, which the students have the privilege of examining and operating. Instruction is also given in pipe fitting, placing shafting, babbiting bearings. soldering, etc.

It is the aim to make this work as practical as possible. Questions of interest on the subject are freely discussed.

VI.—FACTORY BOOKKEEPING.

All the essential features of factory accounting from the receipt of the milk to the returns in net proceeds are thoroughly considered. Paying for the milk according to the fat content, or otherwise, is fully explained. The students do, in books provided, the actual one month's accounting of a creamery.

REQUIREMENTS FOR ADMISSION.

Experience has shown that students who have had some practical training in the creamery or cheese factory before coming to the dairy school are, as a rule, the ones who are able to make the most of the course; it is therefore required that persons who intend to take this course shall have had at least one season's experience before coming to the school. No entrance examination is required.

EXPENSE.

A registration fee of $15 is required of each student. Students can board in either city and reach the school by street car, or board can be secured near the school for from $3.50 to $4.00 per week. Each student is required to supply himself with two white suits, including caps, to be worn during working hours in the creamery and cheese rooms. The suits may be procured for about $1 each.

DAIRY CERTIFICATES.

The Regents will grant dairy certificates to students who have taken the course and passed a satisfactory examination and in addition have demonstrated by at least one year's work in a factory that they have acquired special skill in the art of butter and cheese making, and are thoroughly qualified to take charge of a creamery or cheese factory.

To reach the school from either St. Paul or Minneapolis take the Como Interurban Harriet street car and get off at Dooley avenue.

Address applications for admission to T. L. Haecker, St. Anthony Park, Minn.

Short Course For Farmers.

FACULTY.

William M. Liggett. *Dean.*
Samuel B. Green, B. S., *Horticulture, Forestry.*
J. A. Vye, *Business Hints.*
Harry Snyder, B. S., *Agricultural Chemistry.*
T. L. Haecker, *Dairy Husbandry.*
M. H. Reynolds, M. D., V. M., *Veterinary Science.*
W. M. Hays, M Agr., *Agriculture.*
Thomas Shaw, *Live Stock.*
J. M. Drew, *Poultry, Workshop Hints.*
A. Boss, *Dressing and Curing Meats.*
Wm. Boss, *Farm Mechanics.*
W. A. Wheeler, B. Agr., *Fungous Diseases.*
F. L. Washburn, M. A., *Insect Enemies.*

JANUARY 6TH TO FEBRUARY 28TH, 1903.

To meet the needs of men of mature age who are busy with the farm the greater portion of the year, a special lecture course has been prepared. Farming is a progressive business. Investigation and experiments by scientific men and the application of scientific truth by practical men are uniting to produce great changes in the practice of agriculture and the management of live stock; therefore the enterprising farmer recognizes that he must bring himself into close relation to the best which is known about his business. The Experiment Station, the College, and School of Agriculture, are of great value to those who take a full course of study but the rapid changes in markets and methods, as well as the discoveries in sciences, render it necessary that even graduates shall continue to be students. The student who graduated five years ago finds that there are applications of principles entirely unknown when he left school. For these reasons it is believed a valuable service may be rendered to men of mature age and experience by a special course of lectures to be known as "The Short Course for Farmers."

Agriculture; Judging the qualities of soils, the selection of farms, planning farms; developing the fields, drainage, roads, fences; developing the farmstead and its buildings; managing fields and growing, cultivating, harvesting and preserving forage and grain crops. The rotation of grain cultivated and grass crops, the use of live stock, and general farm management.

Dairy husbandry: In this division there is a course of sixteen lectures giving an outline of the origin and history of the various breeds of dairy cattle,the characteristics of each and conditions to which each breed is especially adapted. The conformation and type of cow specially adapted to economical dairy work. An outline of the fundamental principles feeding, the composition and character of the various feed stuffs with plain and practical instruction in rearing young stock and feeding dairy cows. Practice work will be given in judging dairy stock.

Animal husbandry: The course will embrace forty-eight lectures to be given in three series. The first will include twenty lectures, the second eight and third twenty.

The first series will treat of such breeds of cattle, sheep and swine as are now popular in the Northwest, or are likely to become more so. They will dwell upon such features as approved form, the uses for which they ought to be kept, the soil and climate best suited to growing them in the best manner, and differences that obtain between them in form, function and adaptation.

The second series will discuss certain of the more practical phases of animal breeding, They will consider the chief laws that govern breeding and how to turn them to practical account on the farm or on the range, and also the selection of prepotent sires and dams. The place for cross breeding and grading up and the best methods of doing the work will be discussed, and also the nature and value of pedigrees. The value of in-and-in breeding will be dwelt upon and also its dangers.

The third series will discuss the feeding and management of beef cattle, sheep and swine on the farm. Foods suitable to each of these classes of animals will be discussed and the, methods of preparing and feeding them to the best advantage. Pastures will also be discussed and out buildings and indeed all the more important features of managing animals from birth to maturity.

MAKING STRAIGHT FURROWS.

A portiion of the period allotted to each lecture will be spent in judging animals brought into the class room. Hence forty-eight exercises will be given in the work of judging live stock.

Agricultural chemistry. Soils and foods are made prominent features of the work in agricultural chemistry. Four lectures are given on the chemistry and fertilizers, including the conservation of the fertility of the soil, the composition and use of farm manures, the draft of different farm crops upon the soil and the methods of making the fertility of the soil availabe as food by the rotation of crops and by other means so as to secure the necessary chemical changes in the soil to produce the highest degree of fertility. Four lectures are also given on the chemistry of foods. Some of the subjects discussed are: The composition and food value of the more important grain and forage crops and their uses as food so as to secure the largest amount of growth or animal products.

Farm mechanics. The instruction given on this subject will consist of lectures on farm mechanics, taking up such subjects as pumps, farm water systems, windmills, the general principles of steam and gasoline engines, placing shafting, pulleys and belts; pipe fitting, soldering, etc. Some instruction will also be given on sharpening and using hand tools, such as saws, planes, chisels, and other tools necessary in farm practice.

Farm implements. The lectures on farm implements will be illustrated, as far as possible, by samples. Stereopticon views will be made use of in illustrating machines that cannot well be taken to the class room. It is the aim in these lectures to bring out the lines covering the draft of implements and the objects attained by their use. Suggestions will be made on selection of implements adapted to various kinds of work. The care of implements when not in use will also be discussed, and an attempt made to give as fully as possible all information that will be beneficial in the care and handling of farm machinery.

Dressing and curing meats. The work in dressing and curing meats will be given in a course of demonstration lectures. In demonstrating these lectures, the animals will be dressed before the class and the reason for each operation fully explained. The methods of cutting up the dressed carcass for different purposes will also be shown before the classs and the use and value of each cut explained. Sausage making, lard rendering, and the "working up" of all parts of the animals will be taught in a simple and direct way.

Farm horticulture. Lectures will be givenon the care and management of the apple and plum in this climate, including such subjects as location of the orchard, selection of the trees, planting, cultivation, green manuring; preparation for winter; advantages and disadvantages of root grafting, budding, and top working; insects and diseases injurious to orchards.

Lectures on the care and management of small fruits will consider the subjects of the selection of varieties, planting and cultivation, origin of new varieties, propagation, marketing, winter protection, also the insects and diseases injurious to raspberries, blackberries, currants, gooseberries, strawberries and grapes.

Under vegetable gardening will be considered the growing of potatoes, tomatoes, celery, onions, squash and cucumbers.

Veterinary science: This work includes a series of lectures on elementary anatomy, animal foods and digestion; and causes, prevention and treatment of common diseases of farm stock. An especial effort is made to have this work practical and helpful to men who are actually handling farm stock.

Fungous diseases and insects: This will be a study of the character, development and methods of treatment of fungous diseases upon cultivated crops, and of the habits and treatment of injurious insects.

Poultry: Twenty lectures will be given on this subject with special reference to the needs of the Minnesota farmer. The following subjects will be considered: Location and construction of poultry buildings and yards; a study of the breeds best adapted to the farmer's use; the hatching, rearing and management of the farmer's flock; feeding for eggs and for fattening; killing and dressing fowls, and packing for market; marketing eggs.

In addition to the above four lecture periods will bevoted to the farm, work-shop hints, such as splicing rope, making rope halters and rope belting, and tempering simple tools.

The above course will begin January 6, 1903, and continue for a term of eight weeks. Classes will be called at 9:00 a. m., and continue until 2:50 p. m. A part of the afternoon will be devoted to study and investigation. The University farm, live-stock, barns, green-houses, grounds and laboratories of the College and School of Agriculture afford ample opportunity for interesting study.

There will be no lecture course on Monday, but this day will be spent in visiting places of interest in charge of some instructor, such as the stock yards, flouring and flax mills, green houses, stock farms, etc.

For this course a fee of $10 will be charged.

Board may be secured within twenty minute's walk from the school, or in either of the Twin Cities at $3.50 to $4.50 per week.

The School is situated at St. Anthony Park, on the Como-Harriet car line, between St. Paul and Minneapolis. Get off at Dooley Avenue.

Farmers wishing to register for this course, or desiring further information, should write to J. M. DREW, In charge.
St. Anthony Park, Minnesota.

Rural School Agriculture.

Wm. M. Liggett, Dean of Department.
Willet M. Hays, M. Agr., In Charge.

Under an act of the legislature the Department of Agriculture of the University of Minnesota is charged with the preparation of leaflets and other material which will aid in introducing into rural schools studies calculated to build up country life and the business of farming. This work is done in co-operation with the State Department of Public Instruction. The Department of Agriculture is (1) undertaking the preparation of leaflets, charts and other school room helps; (2) the promulgation of plans for the use of teachers in leading the pupils to observe and experiment on the farm and in the home, requiring from them written or ora- reports; (3) assisting in the utilization of the natural objects of the county for illustration in the rural school; (4) the decoration and use of the rural school grounds; (5) and correspondence with teachers and county superintendents to aid and encourage them in carrying out plans for bringing the county school more into unison with country life and rural affairs.

The Department of Agriculture will also co-operate with the State Department of Public Instruction in introducing the study of agriculture into the teachers' summer institutes and into other schools where teachers are being educated for service in rural schools.

The newness of this work makes it necessary that much experimenting be done; that personal work with teachers be regularly followed up; that every agency be enlisted to help, and that the best be chosen for future work. Co-operation with those interested in similar work in other states is contemplated. The Department of Agriculture earnestly solicits the co-operation of teachers, county superintendents, farmers, and all others who are in touch with the rural schools, and suggestions are invited from those who have had experience in rural school work.

The instructors in the Department of Agriculture of the University will provide much of the material for leaflets, charts, plans for school grounds, gardens, etc., while others in this and other states who are especially adapted to prepare such material will be employed as occasion demands. Efforts will be made to arouse rural youth to the advantages of country life; to show them better ways of home making; to lead them to observe more closely the things they see daily; to arouse them to clearer thought; and in some measure to teach them facts and principles of nature and lead them to have faith in and knowledge of improved methods of farming and home making. There is no design to diminish the energies applied to teaching the elements of academic learning, but to so enrich the course with interesting things of nature, of country life and of farming and farm home making that the rural school will have a larger influence in general education, as well as in preparing the boys and girls of the farm for advanced standards of country life. The work of the teachers of rural schools will become more interesting, more effective, and, if well done, will lead to longer engagements, better remuneration, greater satisfaction and a larger influence.

When the work of the rural school is brought more into line with country life and affairs, it will gain a closer connection with farmers' clubs; the literature of agriculture will come to its bookshelves; specialists in plant production, in animal production, in home making, and in other lines of rural affairs, will all desire to aid in placing in the rural schools the new and interesting things in their work. Students of nature will here find an avenue to promote nature study. The opportunities here afforded to teachers of agriculture, horticulture, animal husbandry, dairying, home economics, household science, and the sciences related to agriculture and home making, are very attractive. Many of the simple, yet important and fundamental facts, both old and new, can here be carried from the leaders of thought to hundreds of thousands of country boys and girls who are ready and eager to receive knowledge. Every teacher who aspires to write a leaflet, prepare a chart, plan a rural school garden or devise experiments or observation work should first sit again on the benches of the rural school and thus unite with the point of view of the mature teacher and experimenter. that of the boy or girl whose mental horizon is the farm and the rural school district.

MINNESOTA, NO. 163, WHEAT ON UNIVERSITY FARM.

The Agricultural Experiment Station.

OFFICERS OF THE STATION

William M. Liggett, *Director.*
Willet M. Hayes, M. Agr., *Agriculturist.*
Samuel B. Green, B. S., *Horticulturist.*
Otto Lugger, Ph. D., *Entomologist and Botanist.* (Deceased.)
Harry Snyder, B. S., *Chemist.*
T. L. Haecker, *Dairy Husbandry.*
M. H. Reynolds, M. D., V. M., *Veterinarian.*
Thomas Shaw. *Animal Industry.* (Resigned.)
Frederick L. Washburn, M. A., *Entomologist.*
Andrew Boss, *Associate in Agriculture, in Charge of Live Stock.*
T. A. Hoverstad, B. Agr., *Superintendent Sub-station, Crookston.*
R. S. Mackintosh, B. Agr.,*Assistant in Horticulture, University Farm.*
Herman H. Chapman, B. S., B. Agr., *Superintendent Sub-station, Grand Rapids.*
E. W. Major, B. Agr., *Assistant in Dairy Husbandry.*
J. A. Hummel, B. Agr., *Assistant Chemist.*
Coates P. Bull, B. Agr., *Assistant in Agriculture, Rural Engineering.*
John Thompson, B. Agr., *Atsistant in Agriculture.*
J, A. Vye, *Secretary.*

The Agricultural Experiment Station of the University of Minnesota is devoted to the discovery of facts and processes useful to the farmers of the state, and to widely disseminate knowledge of improvements in agriculture and home making. This station was established in 1887 under laws enacted by the state and national governments. It is supported in part by funds supplied through the University by the national congress, and in part by funds appropriated by the state legislature. It has also a small income from sales of products. It has published annual reports since 1892, seventy-three general bulletins, fourteen press bulletins, twelve class bulletins; and twenty-four press bulletins have been published by its sub-station at Grand Rapids.

The work of experiment stations embraces a wide range of agricultural subjects included under the headings of agriculture, horticulture, forestry, animal husbandry, dairying, agricultural chemistry, entomology and veterinary science.

Bulletins giving the results of experiments are published in editions of 12,000 copies. These are sent free to all farmers in the state who ask to have their names placed on the station mailing list, and the postoffice department carries them free under the director's franking privilege.

The experiment station is located at University farm, St. Anthony Park, where most of its officers also teach in the college and school of agriculture. It uses the larger part of University farm, containing 250 acres of land. It has the use of portions of several barns, laboratory buildings and storage rooms for seeds and feed stuffs. It utilizes many animals of the various breeds, also grades, in experiments in animal and dairy production.

The work at University farm is supplemented by the sub-station located at Grand Rapids, on land that is characteristic of the northeastern part of the state, and by the sub-station located at Crookston, on land that represents the soil of the Red River Valley. Each of these farms is equipped with buildings and machinery and is in charge of a competent superintendent. Experiments are also carried on at the farm of Supt. O. C. Gregg, in Lyon county (Coteau Farm), which is typical of the agricultural lands of the southwestern part of the state.

The experiment station deals with the problems most vital to agricultural production and life on the farm. Much effort is being devoted to increasing the yields and valued per acre of out staple field crops. The crops themselves are nearly all under experimentation in the effort to so breed them that they will yield more, and new varieties have been secured in some instances which do materially increase yields. The soils and fields. also receive attention and system of rotation and of farm management are developed which increase the yield of the fields and result in larger net income from the farm, besides greater satisfaction from conducting business in a more systsmatic manner.

Improvements in the feeding, management and breeding of live stock are worked out, especially important work having been done in raising annual pasturage and thus improving summer feeding of sheep, hogs and cattle.

Dairy production and dairy manufacture have been greatly improved by the work of the station; the work in economical feeding and the selection of dairy cattle, and the assistance given to co-operation in creamery management having been especially productive of good to the state.

In horticulture many experiments with varieties and methods of propagation are under way.

The many visits made to the station grounds by horticulturists may be taken as evidence of the useful facts here demonstrated.

The possibilities in securing timber belts in the drier portions of western Minnesota have been amply illustrated in forestry experiments at Coteau farm.

The chemistry of food stuffs, grains, soils, and of human foods, also of feeding both animals and men is being worked out in the station laboratory in a manner which is of great value to the state.

The etomological researches made by the station are aiding farmers and horticulturists to combat many insects for which they formerly had no remedy.

In veterinary medicine and surgery various new means of preventing and curing diseases are sought, and improvements are made in surgical processes with the domestic animals.

The officers of the experiment station are ever ready to advise by letter or by personal interview, and the correspondence of the station increases annually.

The experiment station is in co-operation with the U. S. Department of Agriculture and with several experiment stations in other states. Besides the sub-stations mentioned above it is assisted by nearly a score of trial stations, associated with the State Horticultural Society. It has also enlisted several hundred farmers and seed growers as seed co-operators who are aiding the station in disseminating its newly originated and tested varieties of field seeds. Nearly fifty farmers are serving as statistical co-operators aud are assisting joint agents of the station and of the U. S. Department of Agriculture in securing data as to the cost of growing crops, and of producing livestock products.

HYBRIDIZING WHEAT.

PUBLICATIONS OF THE DEPARTMENT OF AGRICULTURE.

BULLETIN OF THE EXPERIMENT STATION FOR 1901.

ANNUAL REPORT FOR 1901.

General Bulletins:

No. 70 Influence of Wheat Farming on Soil Fertility.
No. 71 Investigations in Milk Production.
No. 72 Prairie Forestry and Horticulture at Coteau Farm.

Press Bulletins:
- No. 11 Producing Silage and Fodder Corn.
- No. 12 The Rocky Mountain Locust.
- No. 13 The Hessian Fly.
- No. 14 The Feeding Value of Wheat.

Class Bulletins:
- No. 11 Smut in Oats and Wheat.
- No. 12 Outlines of Greenhouse Laboratory Work.

THE FARM STUDENTS REVIEW.

MAIN BARN AT UNINERSITY FARM.

The Alumni Association of the School of Agriculture, with some aid by officers of the department, publishes a monthly agricultural paper, now in its seventh year. This paper keeps the graduates in touch with each other and with the department, and provides a medium through which they may relate their experiences in various lines of farming and home making. It has articles by graduates, students, members of the faculty and by others especially qualified to discuss agriculture, live stock, dairying, horticulture, agricultural chemistry, home economics, the rural school and other subjects relating to country life. It serves also as a semi-official organ of the Alumni Association and of the Farmers Club of Minnesota (an organization made up of students and ex-students of all the courses of the department of agriculture.)

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